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An evangelical perspective on science and the Christian faith

"The fear of the Lord is the beginning of Wisdom." Psalm 111:10

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"TOWARDS A CHRISTIAN VIEW OF SCIENCE"

The journal *Torch and Trumpet*, Vol. 20, No. 10, October 1970, page 18, carries the final installment of a reprint by the above title from *The Banner of Truth*. The author is Gordon J. Keddie. The conclusion of this article sums up the author's criticism of what he terms "neo-evangelicals."

> ***"It is the contention of this paper that the neo-evangelical "trend" is a down-grade movement from truly evangelical Christianity. We shall briefly summarize the characteristic views of this group and comment thereupon by way of conclusion."***

Included in the company of "neo-evangelicals" are F.H.T. Rhodes, R.H. Bube, and M.A. Jeeves, as well as Bernard Ramm, N.H. Ridderbos, Jan Lever, Carl F.H. Henry, and J. van de Fliert. What the author calls "the characteristic views of this group" form such an important area, that this response is given in the hope that we may come to grips with the basic issues and cease to be shunted into blind alleys.

In what follows, the quoted items in the summary of Gordon Keddie are printed in italics. Comments on each point follow; I can speak only for myself.

1. *Scripture, while held to be divinely inspired and infallible, is nevertheless handled in such a way as to subordinate it to modern science where the Bible speaks on topics common to theology and natural science (e.g., creation, miracles).*

The Scriptures are not subordinated to modern science when the Bible speaks on topics common to theology and natural science, e.g., such topics as creation, miracles, the resurrection etc. Only the Scriptures have the authority to speak about the reality of the creation, the miracles and the resurrection. These questions cannot be touched by modern science, much less settled.

We may know that God created, for example, only through the revelation of the Scriptures. We may know that we are not the chance results of a "collocation of atoms," to quote Bertrand Russell, only by the authority of the Word of God. We may know that the entire universe depends for its very existence moment-by-moment upon the sovereign power and will of God only because He has spoken in the Scriptures. Divine Creation is always revealed, never discovered. Of the fact of creation there can be no debate.

What the Scriptures do not necessarily tell us, however, is the *mode* of creation. Scientific mechanisms were generally not within the purpose of Scriptural writers who aimed to present a revelation in terms understandable by all men in all times. It may well be that they did present the mode or mechanisms by which God worked. It may also well be that they had no intention of presenting such a mechanism, and in fact did not present such a mechanism. How are we to decide? It is at this point that we can admit the investigation of God's natural revelation in His creation (Romans 1:20) to act as a guide in our interpretation of the content of the Biblical revelation as to mechanism.

(a) *The Bible is assumed, a priori, not to reveal "scientific" information, that not being the purpose of special revelation.*

This is not an *a priori* claim. It is arrived at, when it is, only by the guidance of the interpretation of God's natural revelation as this bears on our interpretation of God's special revelation.

That we may not *expect* the Biblical writers to be concerned with the revelation of specific *mechanisms* of God's activity (electromagnetic fields, DNA code, nuclear forces etc.) is a consistent reaction to the Bible's own commentary on its purpose. The Bible tells us that it was written to reveal the redemption of God in Jesus Christ (John 20:31), to comfort and strengthen the faith of God's people through the witness of men who had known and experienced God's life (Luke 1:3,4), and to present a guide for Christian living (II Timothy 3:16).

An analogy may be helpful at this point. In a way the situation to which some portions of the Biblical revelation address themselves, particularly the early chapters of Genesis, is like that of a mother attempting to explain the "facts of life" to her 5-year old daughter. To her she speaks of growth, love between man and woman, and the beginning of a new life that flows from that love. She does not give the technical details of sexual activity. When the child is older she will learn these things too. Her total understanding of the role of sex will depend on her appropriation of both these kinds of information, that dealing with interpersonal relationships of love as well as that dealing with technical details of reproduction and sex fulfillment. The mother has spoken truly to her 5-year-old daughter. She has told her what she needs to know, things that will always be the most important part of her knowledge in this area. So in his infinite wisdom, God has revealed to us the most important things—things that we could never really find out for ourselves. The details of mechanisms we will learn in His providence as we grow and understand more of such things.

(b) *General disregard for strict exegesis of the Scripture is evident. This also holds for the practice of comparing Scripture with Scripture before arriving at any interpretation.*

Exegesis is guided by hermeneutics. Presumably it is the purpose of the Biblical exegete to derive the content of the Biblical revelation, to set forth the revelation which God gives to us. He cannot do this without an understanding of the proper hermeneutics. These cannot be chosen arbitrarily, but must be consistent with the nature of the Biblical revelation. Before we talk of "strict exegesis," therefore, we should talk of "Scriptural hermeneutics." We cannot understand what it is that the Word of God says to us if we impose some arbitrary system of hermeneutics in our exegesis.

There remain Biblical areas where the appropriate hermeneutics need further work. Since God's truth is one, any guidance that can come to the formulation of these hermeneutics by an understanding of God's natural revelation in creation, must be welcomed and not rejected.

(c) *There is increasing use of the inductive method of studying Scripture—a methodology inconsistent with the Biblical doctrine of inspiration.*

If the Scriptures are indeed divinely inspired and therefore authoritative and trustworthy in conveying the revelation they were written to present, as we believe them to be, then any Spirit-guided method of approaching Scripture, whether inductive

or deductive, can lead us only to God's truth in terms of the proper hermeneutical principles to apply.

2. *Science, in its widest sense, is regarded as complementary to the Bible in contributing to a view of reality. The two are independent but interdependent. Thus science is autonomous and speaks for the realm of nature as the Bible does for that of faith.*

This statement expounds a commonly held confusion of categories. Science is *not* regarded as complementary to the Bible. The created natural world is regarded as complementary to the revealed word of the Bible. Science is a human interpretation of data derived from sense contacts with that created natural world. Its complementary category in Christian faith is not the Bible (which corresponds to the created world—the data) but rather *theology*, which is the interpretation by men of the revealed word of the Bible in the light of the Bible and their experience. God made the world, and God gave the Bible. Men make science and men make theology.

Men make mistakes in interpreting the natural world where their scientific hermeneutics are faulty. Men make mistakes in interpreting the Bible when their theological hermeneutics are faulty. The theology of men can no more be accepted as superior to the created world, than the science of men can be accepted as superior to the Word of God.

Any attempt to juxtapose science vs. the Bible, to plead that men accept the Bible rather than science, is a result of a misunderstanding of the categories involved. The revelation of creation and the fossil record must confront each other; the theory of fiat creation and the theory of organic evolution must each be justified. There is no more possibility, or perhaps I should say there is just as much possibility of "accepting the Bible" as there is of "accepting the natural world." Both *can* be accepted in that we accept their trustworthiness. What we then apply to ourselves on the basis of this trustworthiness depends on the results of our hermeneutics and our exegesis.

(a) *Modern science is regarded as the study of natural revelation and its best authenticated results (according to its own standards of course!) are considered to represent a valid picture of that revelation.*

This statement in itself is not a condemnation. Its counterpart would be that modern theology (orthodox fundamental Protestant, if you will) is regarded as the study of the special revelation and its best authenticated results (according to its own standards of course!) are considered to represent a valid picture of that revelation. I do not consider this latter statement offensive, and so I do not consider the statement of Gordon Keddie offensive either.

On the other hand, modern science is not regarded as presenting a "valid picture" of the natural revelation, if by "valid picture" is meant any more than a relative pragmatic approach to the nature of physical reality. The Christian man of science regards his scientific understanding as a helpful guide, not as a source of ultimate truth. As his science is more and more faithful to the created structure of the physical universe, he believes that his scientific picture is more and more like that of the reality of that created universe. Also, although his scientific picture may not be able to describe completely what physical reality *is* like, it may well be able to give a definite indication as to what it is *not* like.

(b) *Any conflict between "traditional Biblical interpretation" and modern scientific discoveries must result in a re-examination of the former with a view to reinterpretation.*

I would agree that when traditional Biblical *interpretations* come into conflict with any type of experience, whether scientific or personal, it is good to re-examine them. I demand the same of traditional scientific interpretations. Not to be willing to re-think interpretations is to forsake the pursuit of truth. Because interpretations may be faulty never implies that the ground of revelation is faulty. Because a scientific interpretation of the physical world is in error casts no doubt on the trustworthiness of the revelation contained in that created physical world. Because a theological interpretation of the Bible is in error casts no doubt on the trustworthiness of the revelation contained in the Bible.

(c) *No distinction is recognized in principle between the science practiced by Christians (true science) and that of unbelievers (apostate science). There is no consistently Christian philosophy of science.*

There *is* a consistent Christian philosophy of science. The Christian believes in the structure of reality, a created structure given by God Himself. Truth is that which is in conformity with this structure of reality. Thus it is possible for an unbeliever to know partial truth, but never total truth.

The Christian philosophy of science is this: Christian science is *good* science. And good science is science that is faithful to the structure of reality. Science that is honest, open, seeking to capture and to reflect the structure of the world that is really there—that is good science, and that is Christian science. The unbeliever is successful in science, successful in apprehending partial truths of the universe, when and only when he appropriates for himself the Christian approach to the world without recognizing that he is doing it, and without acknowledging the ground of reality that makes it possible for him to do it successfully. Thus the success of the non-Christian in science can be attributed to his use of Christian principles of scientific investigation, principles which seek above all else to be faithful to the created structure of the world.

It is becoming for the followers of Christ to be informed and perceptive as well as militant. We spend so much time and effort in battles that need not be fought that we do not have the strength left to engage where we are desperately needed. If we recognize that we have trustworthy revelation from God both in the natural world and in the Bible, can we not then cease from pursuing these false dichotomies: science or Scripture, evolution or creation, natural or God-caused, chance or providence?

R.H.B.

Christian Philosophy of Science: An Unfinished Business

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What contribution does the Christian philosophy of Herman Dooyeweerd make to the philosophy of science? This was the question debated for four days and four nights by the group of scientists and philosophers who met at Wheaton College in December 1969. Their discussions and disagreements clarified in this observer's mind some salient features of Dooyeweerd's philosophy and identified the problems in philosophy of science to which he speaks. The seminar as a whole provided a worthwhile preamble to further inquiry which is needed in this area.

I. THE RELIGIOUS ROOTS OF THEORETICAL THOUGHT

(1) Dooyeweerd insists that all theoretical thought has pretheoretic roots.[1] Life is prior to learning; the lived-world is both logically and chronologically prior to scientific abstraction; the presuppositions by which a man lives will shape his theoretical work as well as his naive experience. The presuppositions by which a man lives are basically religious, in the sense that they embody his ultimate beliefs and values, the orientation of his heart either toward or away from God. Consciously or unconsciously, to some extent be it small or great, be it evident or hidden, be it consistently or inconsistently developed, what we are in relation to God shows up in the way we think. Theoretical thought has pretheoretical, "transcendental," religious roots. As Robert Knudsen put it, "One who is occupied theoretically can, as it were, look back over his shoulder, to the religious motive which is driving his activity and which is establishing its orientation." Dooyeweerd ac-

cordingly insists on a "transcendental method" in both critical and constructive thought.

(2) In critical thought, this means examining the "transcendental" presuppositions of a thinker. Calvin Seerveld illustrated it by pointing out the effect of naturalistic assumptions on the aesthetic theories of people like John Dewey and Susanne Langer, and by comparing a series of classic paintings by Christian and non-Christian artists of a similar subject. His point was that both in aesthetic *theory* and in artistic *practice*, a man reveals the religious orientation of his life. However, this was not illustrated as specifically in regard to the criticism of either theory or practice in the natural sciences.

The presuppositions by which a man lives are basically religious, in the sense that they embody his ultimate beliefs and values, the orientation of his heart either toward or away from God.

(3) In constructive thought, the transcendental method gives careful and explicit attention to Christian presuppositions. The Christian believes the Creator to be a Sovereign Law-Giver, the structure of whose law is evident in creation and is both objective and universally binding. Aesthetics, logic, psychology, physics and every other science should therefore conform. Dooyeweerd, it should be noted, extends the term "science" to any theoretical discipline concerned with a distinct aspect of human experience. There are at least 15 such sciences, for human experience discovers at least 15 distinct aspects of experience, each subject to the law of God. In each case, as Van Riessen pointed out with regards to physical science, the scientist needs a carefully defined concept of the aspect of experience with which his discipline is concerned, and a careful understanding of what makes possible a scientific statement in his particular science, if he is to work effectively in his particular "law sphere". Each science is somewhat different in these regards, different in its subject matter and different in its methodology. Each is therefore sovereign within its own sphere, free from the reductionism that would annex one science to another regardless of differences in the objective law structure on which the sciences depend.

(4) Finally, Dooyeweerd insists that each science, while distinct, is related to the others in a coherent whole, for all creation bears witness and points to one Law-Giver. But it bears witness in the hearts of men [see (1) above] where we either grasp or reject that unity of meaning through the orientation of the heart towards God. A wrong religious orientation misconceives the unity of meaning, and can therefore distort the relationships of the sciences and deceive us about the concept and methods of a particular science. [See (3) above.] This has happened historically, and this is why transcendental criticism is needed. [See (2) above.]

There, in overly brief form, are four salient features of Dooyeweerd's philosophy. In sum, theoretical thought is both subjectively and objectively dependent. In neither case is it autonomous: objectively, it depends on the law-structure created by a Sovereign God; subjectively, it depends on the pretheoretical, religious roots from which both life and thought issue.

II. PROBLEMS IN PHILOSOPHY OF SCIENCE

To what problems in the philosophy of science does the foregoing speak, and how directly? I shall comment on four problems that were identified in the discussions.

1. *The foundations of science.* Ever since David Hume exposed the limits of empiricism by opening up the logical problems connected with causation and induction, philosophers of science have been probing this matter. Some have retained an empirical approach by resorting to a purely operational or instrumentalist view of science. Others have reverted to intuitionism or formalism. The problem affects the foundations of mathematics and logic (which Dooyeweerd regards as sciences) as well as the more experimental sciences, and it has concerned phenomenologists like Husserl and analysts like Russell as well as metaphysicians like Whitehead.

Dooyeweerd too is concerned about it. His transcendental criticism scores other approaches for assuming the autonomy of theoretic thought, as if the foundations of science are somehow immanent within science itself. This, he declares apostate; it ignores both the transcendental (subjective) roots and the God-given (objective) law-structure of science.

Is this sufficient, however? Granted that other approaches are non-Christian, just what Christian alternative is proposed? Does it have to altogether bypass intuitionism and formalism and all kinds of empiricism as if the problem they addressed is a pseudo-problem, born in apostate minds? Perhaps the problem needs restating (just how it would be restated is not altogether explicit), but is it completely and utterly inconsistent for the Christian to be an empiricist of sorts, or an intuitionist? Why? What we need is a careful Christian appraisal of intuitionism (*et al*), its roots and its fruits, in mathematics and other sciences. This is unfinished business.

(2) *Reductionism.* Especially since Auguste Comte attempted his classification of the sciences, we have witnessed attempts of various sorts to reduce the methods and concepts of one science to those of another, or of all sciences to those of just one. This is characteristic of positivism past and present, of historicism, psychologism, etc. It is resisted, however successfully, by phenomenologists like Husserl and analysts like Wittgenstein, and it is resisted by Dooyeweerd.

His vehicle is the theory of law-spheres, each a sovereign state independent of the others, and each concerned with a distinct aspect of experience. If his theory properly represents the objective law-structure of creation, such that the law of God is inevitably fragmented into at least 15 different modes when it intrudes into temporal existence, then he certainly offers a powerful alternative to reductionism.

But it was the irreducibility of law-spheres which provoked most dissent at the conference. (a) Dooyeweerd's thesis supposes a kind of gulf between time and eternity that is not necessarily Biblical. (b) The fixity of law-spheres is too like the old fixity of species to make the scientist happy. It appears to be an imposed dogma rather than an evident structure. Instances were cited where purported law-spheres appear to merge; and the case for fixity is not helped by accommodating the law-spheres to such phenomena.

(c) The relationship betwen man-made classifications (whether of sciences or of pre-scientific experience) and Divinely created structures remains unclear. Within each science, it seems the scientist is responsible for his own classifications. But in the overall the philosopher provides an *a priori* structure for classifying the sciences themselves.

Dooyeweerd's alternative to reductionism, then, as well as his view of the foundations of science, leaves a great deal of unfinished business.

(3) *The status of scientific law and theory.* The tendency in science today is to regard laws as man-made formulations, rather than necessary structures. It was not always so. Greek and Medieval science conceived of real forms immanent in nature, and Renaissance science had its imposed laws of motion: in both cases the structure of things is both immanent and necessary. Nineteenth century science, with its positivist reaction against metaphysics, contented itself more with descriptive generalizations, and the present emphasis on models and constructs and operational definitions has not departed as far from that tradition as we sometimes suppose.

Dooyeweerd reminds us that the creation of a sovereign God is through and through ordered and purposeful. There are no bare, unrelated facts waiting to be structured according to the convenience of men. The law-structure is objectively real, and the scientist is responsible to it. Scientific theory has objective controls as well as instrumental values.

Dooyeweerd reminds us that the creation of a sovereign God is through and through orderly and purposeful. There are no bare, unrelated facts waiting to be structured according to the convenience of men. The law-structure is objectively real, and the scientist is responsible to it.

It follows that operationalism, phenomenalism, instrumentalism, and related views of scientific knowledge are insufficient, for science should get at *real* structures, interpretive and fallible though it be. But how does one get at real law-structures in his particular science? What are the respective roles of models and constructs and experimental procedures? What relation has theory to fact and fact to theory in concept-formation and confirmation procedures? Just how do religious roots affect different views of scientific explanation? Specifically how and how far do they affect the procedures and assumptions of the working scientist? Until these questions are carefully answered, Dooyeweerd leaves us with some important generalizations, but with an incomplete philosophy of science. This too is unfinished business.

(4) *Subjectivity and objectivity in science.* The scientist is a historical person, with both individuality and temporal limitations. Writers like J. Bronowski and T. S. Kuhn and Michael Polanyi have stressed the effect these factors have on theoretical thought, while Israel Scheffler has recently urged caution in his *Science and Subjectivity.* Dooyeweerd's contribution here is his insistence on the fundamental influence of *religious* subjectivity in and through and above all other aspects of personal and historical existence, and the demand that we understand the nature of scientific objectivity accordingly.

But this has to be worked out more fully in regard to science as a whole and in regard to each particular science. What does objectivity mean in sociology, and how does it differ from objectivity in physics or in mathematics? Are subjective influences equally evident in all sciences, or are there differences of degree depending on the proximity of a science to (say) theology and ethics? Why is it easier to detect the influence of non-Christian presuppositions in painting than in mathematics? In order to answer these questions, we must see more precisely how religious presuppositions relate to the "presupposita" of each particular science. This too is unfinished business.

III. CONCLUSIONS

The unfinished nature of the project may be an illusion created by my lack of understanding. But at present it seems to be also due to the limitations of Dooyeweerd's philosophy, including the technicality and obscurity of his language and the seeming rigidity of his system, and to the fact that the transcendental method has not yet been pressed far enough to the kind of questions we have raised.

What difference does it make to the research scientist or the teacher? In the first place, we have been discussing the philosophy of science, which is theoretical thought about science, not the teaching of science or its experimental procedures. Whatever difference it makes, therefore, will be indirect rather than immediate. In the second place, practical consequences will not become clear until some of the unfinished theoretical business is taken care of more completely. The effect of philosophy of science on science comes via such things as the relationship between the sciences, the bearing of theory on fact, and the nature of objectivity. Just how Dooyeweerd's approach to these subjects affects the laboratory and the classroom is not yet fully clear.

This much, however, can be said: (1) Science cannot be isolated from religious and philosophical considerations, for in them it finds its own logical basis, and gains self-understanding. (2) The scientist must be religiously and "world-viewishly" awake, alert to the role of religious motives and philosophical presuppositions in his work. (3) It must be stressed with renewed clarity that the scientific enterprise is a Divine calling to explore the ways in which the whole creation reveals the law of God, and so bears witness to its Creator.

FOOTNOTE

[1]The uninitiated reader is directed to Dooyeweerd's *In the Twilight of Western Thought* (Philadelphia: Presbyterian & Reformed Publishing Co., 1960), and to J. M. Spier, *What is Calvinistic Philosophy?* (Grand Rapids: Eerdman's, 1953). Dooyeweerd's *magnum opus* is his four-volume *New Critique of Theoretical Thought* (Philadelphia: Presbyterian & Reformed, 1953).

Whatever Happened to Scientific Prestige?*

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Within the past twenty-five years we have seen the rise of the prestige of science to unprecedented heights and also its current fall toward unprecedented depths. It is important that we understand the causes of these changes and resolve upon a consistent course of action for men who are both Christians and scientists.

Four Descriptive Tableaux

1. I was an undergraduate in physics at Brown University when the atomic bomb was first dropped 25 years ago. I rushed to my physics professor to ask him if it could really be true that the atom had been split. He assured me that indeed it was true. We rejoiced at this scientific triumph that had assured a rapid end of the war. It was only in later years that we began to wonder whether it had really been necessary to drop the first bomb on the populated area of Hiroshima rather than in some unpopulated spot as a warning. And why was it necessary to repeat the devastation over the second populated area of Nagasaki? If scientists were not to blame for the decision to drop the bomb, they were certainly responsible for producing it.

2. The San Francisco Mime Company paid a visit to the Stanford campus during last spring's days of tension. They presented a play called 'The Rape of the Earth." Representatives of business, government, the university and science were trotted out to respond to the people's needs. Business advocated more rape; government advocated some paper work; the university advocated further study. The scientist had a plan. When the people protested that science's plan would cause the death and suffering of many poor people, the scientist replied, "Uh, uh! Now you're being subjective again!"

3. A university meeting was held to discuss the implications of military-related research on the university campus. A speaker arose from the audience and insisted on his scientific right to pursue knowledge or application regardless of what society might do with it. If he wanted to work on poison gas or biological warfare, it was his academic right to proceed.

4. A trend was emphasized by the Kinsey report. If many young people engaged in pre-marital sex, then this meant that pre-marital sex was natural, and if it was natural, it was certainly good. Other scientific reports have added to the confusion. Scientists report that the use of marijuana does people no harm. Scientists report that they have scientific proof that exposure to hard-core pornography does people no harm. Meanwhile our society is decaying around us.

From all sides and for all kinds of reasons, science is under attack.

Recent History

Science is a way of knowing based on the interpretation of sense contacts with the physical world.

For over a century the scientific method has been exalted as the only road to truth and as capable of providing all the answers to man's problems. Science won the war. Science provided improvements in transportation, medicine and communications that revolutionized life. When national need to catch up to the Soviet space program developed, science was exalted even further. Science was introduced in Kindergarten and funds for scientific research almost exceeded what could be reasonably spent.

Now all of this is in reverse. Why?

Past History

Some insight into the present situation can be obtained by reflecting on the period of Deism that followed Newton. Successes in producing mechanistic descriptions of the world led to the attempt to produce a rationalistic religious and world outlook. It was the day of the clock-maker complex as the model for God. What started as a defense of religion turned into first a substitute for religion and then a base for an attack on religion.

This situation eventually gave rise to a reaction in terms of the Romantic Rebellion of the late 18th and early 19th centuries. The Romantics emphasized immediate experience, freedom, individuality, dynamic change and novelty. Religiously-oriented Romantics emphasized devotion in life instead of only in creed, and the pietistic movement started.

We are living in a similar day. Modern Deists uphold a "mechanical man" to stand alongside the "mechanical God" of the 18th century Deists. As says Dean Wooldridge in *Mechanical Man,*

*Based on a paper presented at the Annual Convention of the ASA, Bethel College and Seminary, August 1970.

> This is not to say that complete atheism will be required. . . . There will be no reason why the term "God" cannot still be used to denote the seemingly inexplicable origin of the laws and particles of physics.

The Hippies are today's secular Romantics; the Pentecostalists are today's religious Romantics. Everywhere rationalism is on the run.

The inveterate assumption underlying the gospel of progress is the assumption that the growth of science and technology, of man's comprehension and mastery of nature, will necessarily produce an increase in human happiness and well-being. But is this true? Certainly there has been progress of a sort in Western society and, over the long view, for mankind as a whole. Life has become easier for many. More people have opportunities to study, to learn, to enjoy. Yet, strangely enough, man is not happy. He wants to know whence he came, whither he is going, and what he must do to find peace with himself and his fellow man. His mind grows weary thinking of indefinite progress onward and upward, of infinite future possibilities to be realized, when he is unable to realize a fraction of the possibilities of his present nature.

John C. Greene

Darwin and the Modern World View, Mentor Books (1963), p. 96

Our Situation

Our difficulty has followed largely from the tacit acceptance of the proposition that science is the only road to truth, and that therefore anything unscientific is either unknowable or false. (This proposition must, of course, except itself.)

We smiled at the naivete of the Soviet astronaut who reported the confirmation of his atheism by not finding God during his space trip, yet we agreed with him. The scientific investigation of the mechanisms of the human body provided a model of an organic computer, or of a complex organic machine. Since science provided the whole truth, it followed that man was *only* an organic computer, *only* a complex machine. The scientific investigation of the universe revealed a fantastically immense and complex structure in both the physical world and in human history. Since science provided the whole truth, it followed that man was an insignificant object caught up in the vast turmoil of impersonal contingencies and fates.

Destruction of Meaning

Scientific prestige is down because science is equated with the destruction of meaning and faith in life, with rationalism and impersonalism.

A machine buffeted by fate is hardly a man. Not only did God die, man himself died. The baseless faith assumption that science provided the only road to truth led to the engulfment of modern society in meaninglessness and despair. Bertrand Russell was faithful to his convictions; he proclaimed that only despair was consistent with a scientific view of the world. The pattern of despair is available for everyone to see in modern art, music, theater, philosophy and theology.

Now a man has to square his view of the world with his experience. Although he believes that science had shown by a rational process that he is only a complex machine, he can not square this with his own experience in which he knows that he loves, decides, hates, responds, and takes part in meaningful human relationships. How is this possible? It cannot be possible—so he thinks—on the old basis of a God who created the world and cares for the individuals in it, for hasn't science made these traditional religious views unacceptable? If it is going to be possible at all, he is going to have to provide the way himself. By a non-rational—or even an irrational—process, he is going to have to separate himself from the rational, physical, finite, material aspects of this life, and construct a religious faith, a god if you will, all by himself. The widespread interest that we see all around us, in astrology, scientology, witchcraft, drug-use, and increased interest in Eastern religions, with their rejection of the value of the finite and the material, all bear witness to this almost hysterical attempt by man to resurrect his humanity in the modern world.

It is no surprise that when science is equated with the destruction of meaning and religious faith in life, and when a non-rational or irrational approach to life is equated with the only way to re-establish the humanity of man, that strong anti-science and anti-intellectual sentiments develop. Seldom before have more people been seeking more desperately for what can be found fully only in Christian faith.

Ethical Impotence

Scientific prestige is down because of an enhanced awareness of the ethical impotence of science. Scientists toil away at increasing the store of knowledge, perhaps with the hope that some good may come of it, but traditionally rather indifferent to anything other than the contribution to human knowledge. Men take the products of science and use them for good, but perhaps even more commonly for evil. The application of his knowledge falls beyond the competence and frequently the interest of the scientist. In fact,

If the ultimate ends of action have no basis in the structure of reality, there is little point to science. The passion for science then appears as an odd preference on the part of the scientist for a certain kind of activity. This is precisely the situation in which Darwin found himself at the end of his spiritual evolution. Science had become his passion, the only thing that made life bearable, but its ultimate significance was no longer clear to him. He was sure that he had been right in devoting his life to science, but he could not say why.

John C. Greene

Darwin and the Modern World View, Mentor Books (1963), p. 112

There is still another misconception about science that might be corrected by a greater emphasis on the verb sense. The misconception I refer to is the view of science as the all powerful, final authority. The teachers of science in the elementary grades, in the high schools, and in the colleges are too often responsible for originating and perpetuating this image of science as the savior of mankind. The teachers, however, are abetted in this distortion by textbooks that are overwhelmingly taken up with the noun sense of science and in which the subject is presented in *fait accompli* fashion. Science is not free of dogmatic thought and must constantly guard against it. . . . One remedy for both the dogmatism and the savior image of science is a study of the history of science. Such a study, even if it is rather superficial, will make a mockery of the dogmatism and will establish how science has "backed and filled," advanced and retreated.

John S. Rigden

Department of Physics, University of Missouri, St. Louis, Missouri. From "Reshaping the Image of Physics," *Physics Today,* October 1970, pp. 51,52

if he is faithful to his discipline alone, the scientist can make no ethical judgment whatsoever. He has no basis for saying that anything "ought" to be; he can only comment on what is. As ethical beings scientists sometimes feel driven to derive ethical judgments from science; in such a case they can conclude only one thing: what *is,* ought to be. This is a faith judgment with no basis in science. Good and bad are terms that a scientist *per se* can use only in a pragmatic and never in a moral sense.

Today moral concerns are considered vital, even by those whose actions themselves seem unrelated to their concerns. The impersonal carelessness of "scientific objectivity" is an alienating factor. To be publicly indifferent or unaware of the importance of ethical decisions is inexcusable. To be unable to produce the needed ethical guides from science—after claiming to be able to do so—again leads to the anti-science sentiment.

Illusion of Deliverance

Scientific prestige is down because the scientific faith that promised deliverance to mankind has proved openly to be an illusion. Technological advances have produced conveniences and delights, but they have also produced pollution and destruction of the environment. Improvements in medical treatment have enriched the lives of many, but they have also accentuated the population explosion and its unsolved problems. On every side science's grand claim to be the modern savior is exploded. Many of today's young people tend to look to science as a slave-maker rather than as a deliverer.

Response

What then of us? As scientists we know the importance and the validity of a scientific approach and of a rational (not a rationalistic) view of life. To us an irrational approach is bound to degrade the human being. To us the loss of scientific prestige is a dangerous sign. But also, as human beings and Christians we know full well the limitations of the scientific method. We recognize the fallacy of exalting science as the only way to truth. We appreciate the causes for the loss of scientific prestige. Here we are one with the Hippies, and it is important that we realize it. The Romantic Rebels of today will not accept the dictum of the modern Deist—and like every other rebel he is likely to overthrow everything in reaction.

What can we do? Let me suggest a few possibilities.

1. Make it clear that science is one way of knowing, but not the only way. That the rational and scientific view of life is one of the important perspectives, but not the only one.
2. Make it clear that science is not an infallible impersonal exercise of unconcerned automata, but the human enterprise of fallible men. That scientists are human beings who care about other human beings.
3. Emphasize that scientific investigations cannot be expected to answer the most ultimate and basic human problems, but that these answers must, even in the lives of scientists, be obtained through a religious encounter with the living God.
4. Challenge the postulates of modern popular philosophy which are based on the false premise that science has made all traditional moral, ethical and religious bases unacceptable.
5. Work at the development and integration of a rational faith as the only way to prevent non-rational or irrational excesses.
6. Recognize that the pursuit of science calls for a personal commitment to service through science, and that only those with a real calling to this commitment should be encouraged to enter a career in science.

Conclusion

Misrepresentations and misconceptions of the purpose and power of science have come to full flower in our lifetimes. We cannot expect to overcome these unless we are willing to put our own understanding of science and life in order, and unless we are willing to spend time and effort in communicating our humanity to others.

It is that disturbing fellow, the loving human individual, who makes trouble for the scientist's stern principle of perfect objectivity. Whenever the anthropologist looks at him, something human inside the anthropologist stirs and responds. It is easy enough to be objective toward objects; but the human individual refuses to be only an object. When he is there before you, he insists on being judged as human beings are judged in life, if not in science.

Robert Redfield

The Primitive World and Its Transformations, Cornell University Press (1953)

Religious Beliefs of Scientists

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Several Studies

The question of what kind of religious beliefs are held by men of science has had a long history. While passing through the intellectual scene, observers of all persuasions tip their hats to this perennial topic. It was inevitable, therefore, that the social scientist would direct his questionnaires at the scientific community. This has been done in rather relentless fashion within the past 5 years, with the result that some rather significant light, blessed with an empirical glow, has been shed on the problem.

The pathbreaking work, however, was done by James Leuba some 35 years ago.[1] Sending a questionnaire to scientists chosen from Cattell's *American Men of Science* in 1933, Leuba sought to understand the attitudes of several hundred of these scientists toward a God influenced by worship and immortality. He found that 30% of this group believed in a God moved to action by worship while 33% believed in immortality. The fact he considers to be of greater importance was that 41% did not believe in immortality while 56% did not believe in God. His general conclusion was that while scientists are not as irreligious as one might think, they do not tend to support traditional belief systems. His explanation for these findings was based on the belief that scientists share unique patterns of knowledge and personality characteristics.

A thoroughgoing study of this question was presented five years ago by a sociologist. Patterning his work on that of Leuba's, Rodney Stark addresses himself more precisely to the question of whether religion and science are in conflict.[2] Studying data collected in 1958 for 2,462 students from 25 universities, he concludes that religion and science are not in clear conflict. Contrary to his assumption, scientists will not be exclusively scientific or religious. While religious values did weaken with increased scientific training, as he predicted, they did not completely disappear. He finds the self-image held by the scientist to be the critical factor in determining whether the value system of science will replace that of religion. Thus, he typifies the graduate student of science as uninvolved in religion, lowly involved, and highly involved.

In a more recent study, several sociologists concluded that scientists are relatively neutral to religion.[3] Basing their findings on 642 questionnaires which were mailed to scientists selected from *American Men of Science,* these researchers claim that religion and science have arranged for an accommodation of their differences. This conclusion is based on the fact that 61% of their respondents stated that religion and science are in separate realms, but not in conflict. Of this total group, 17% saw religion and science as complementary and only 14% considered them to be in conflict.

Finally, we refer to a study completed last year by two sociologists.[4] The contention suggested in this study is that religion and science are not in clear conflict because scientists are not less religious than non-scientists. The scientist does not necessarily reject religion, a conclusion which was found by Stark to have validity. Rather, these researchers claim, what is important is the scholarly distance of the scientist from religion. Thus, one finds that those researchers who approach religion from a traditional scholarly perspective, meaning a discipline with low scholarly distance such as psychology or sociology, will demonstrate less religious involvement than those with a higher scholarly distance such as is found in physics.

Intervening Variables

Once the question of intervening variables which may be causal in nature is raised, the question develops an interesting complexity. This matter of scientific field was dealt with in three of these studies. Leuba categorizes four groups of scientists; physicists, biologists, sociologists and psychologists. He finds that physicists had the greatest proportion of believers (38%) while psychologists had the smallest (10%).[5] Following the same approach, Vaughan, Smith, and Sjoberg believe that scientists in applied areas may have a stronger religious commitment than other scientists.[6] Both of these claims tend to support the validity of the scholarly distance variable and further suggest that religion and science are more likely to come into conflict as the area of specialization is unable to be kept separate from a religious belief system.

Another variable which is claimed in three studies to be a causal factor influencing religious belief is scientific eminence. Leuba notes, for example, that the more eminent the scientist in each discipline, the weaker the belief in God or immortality.[7] Stark concurs with this finding. He notes that students with a high quality graduate and undergraduate training tend to have a weaker religious involvement.[8] Such students, he claims, trade religious ties for a scholarly and scientific self-image, thus suggesting that the two sets of values are not completely compatible. The influence of the large and prestigious university was also noted in the 1966 study. It was found that scientists in such universities were less inclined to attend church or to believe in life after death than scientists in business, government, or smaller schools.[9]

A final variable which was considered in three of these studies is religious tradition of the scientist. Lehman and Shriver suggest that parental religiosity is related to faculty religiosity. [10] They note, however, that scientific discipline appears to be an intervening variable. Scientists with a more religious background may choose fields with higher scholarly distance, thereby supporting their religious perspectives. Vaughan, Smith, and Sjoberg emphasize the movement of scientists away from the religion of their parents. They found that 54% of their group had religious affiliations different from those of their parents.[11] From this finding, they imply that scientists, while still desiring a place for religious expression, shift to churches which are more liberal and with a higher socio-economic status. Stark also provides data which underscore a drift on the part of graduate students away from their religious traditions. He sees this erosion as a process which increases as the student moves to higher levels of education.[12] What he notes, in contrast to the previous studies, is that graduate students tend to lose religious beliefs while established scientists are more inclined to shift their religious affiliation rather than lose it.

Interpretation of Studies

These data, of course, would allow speculation to move into many directions. One gets the impression that scientists, like most persons, may use religion as a symbol of their increasing status through the process of changing church membership. The graduate student, being less concerned with such status, would be more willing to give up any claim to religious affiliation. Apparently, the scientist may not be different from the nonscientist in his religious beliefs.

Yet, the findings on eminence and field of discipline suggest that the scientist does experience influences which would not be operative on the nonscientist. The extent to which these influences are the result of the scientist's membership in a learned community or his role as an independent seeker for truth is not clearly dealt with in these studies. Indeed, one might also suggest that the relatively stronger belief in immortality merely shows that the scientist is influenced by his humanity, devoid of any social or scientific overtones.

What does appear to be firmly established by these studies is that there is no clear conflict between religion and science. The problem that remains, however, is whether the removal of this conflict has resulted in a form of compromise between the two spheres of knowledge. If such should be the case, it is quite likely that religion is being absorbed by science. The implications of such a possibility are critical. Stark recognizes the increasing influence of the scientist in our society and concludes that "we much suspect that future American society will either become increasingly irreligious, or that religion will be extensively modified. In the latter case, the historical conflict between religion and science may be finally resolved."[13]

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[7]*Op. cit.* 296-297

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[9]Vaughan, Smith, and Sjobert, *op. cit.* 525

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[13]*Op. cit.* 14

APPENDIX

The results of a survey of over 60,000 faculty members were recently published in *The Chronicle of Higher Education*, (April 6, 1970). Some of the data were based on the question, "In what religion were you raised and what is your present religion?" The results tended to validate the conclusions already suggested. Some of the results selected for illustration are as follows:

Field	*Per cent not raised in any religion*	*Per cent with no religious beliefs now*
Sociology	5.8	41.7
Anthropology	8.7	56.1
Psychology	5.4	44.1
Philosophy	6.0	40.8

These data suggest the validity of the claim that persons in social sciences and humanities tend to lose their religious beliefs more completely than persons in natural and physical sciences. The data for the latter are shown below.

Biology	4.4	30.0
Mathematics	5.0	30.3
Chemistry	4.0	25.3
Geology	5.4	31.4
Physics	7.5	34.9

It is in the applied and technical fields, however, that the least amount of loss of religious belief is experienced.

Business	1.6	11.8
Engineering	4.5	16.8
Nursing	1.7	7.8
Agriculture	2.3	7.3

Why should those eminently reasonable rational beings, the scientists, deliberately prefer to the simple notions of design, or purposiveness, in nature, the arbitrary notions of blind force, chance, emergence, sudden variation, and similar ones? Simply because they much prefer a complete absence of intelligibility to the presence of a nonscientific intelligibility.

Etienne Gilson

God and Philosophy, Yale University Press, 1941, p. 130

Characteristics of the Religious Personality in College Students

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Prior research has shown that the religious individual is different from the general population along certain personality dimensions. This study was conducted to determine in what ways students at a religious college and a state university are similar and dissimilar. Subjects were chosen on the basis of student nominations from the two colleges. At the religious college twenty-five students were put into the category of above normal in personality and the same was done at the state university. After these groups were formed, the students at the religious college were compared with the students at the state university. These two college age groups were compared on the basis of the Sixteen Personality Factor Questionnaire, *the Child Development Scale, and the Personal Data Questionnaire. Some interesting questions are raised by this study.*

INTRODUCTION

One of the goals of society is to develop normal, well-adjusted, mature personalities. Perhaps everyone has a general conception of normality. Specifically, however, what are the characteristics of a normal person?

Different answers have been given to this question. For example, Allport listed three traits which he believes are possessed by all well-adjusted individuals: extension of the self, self-objectification resulting in a sense of humor, and a philosophy of life.[1] Polatin and Philtine gave four characteristics of a normal personality: free of symptoms, unhampered by mental conflicts, satisfactory working capacity, and the ability to love someone else.[2]

Bonney made a study of the normal personality. The highly normal individuals he studied were characterized by: interpersonal attractiveness to other students as friends, forthrightness and honesty of communication with others, capacity for self-assertion and for aggressive response against efforts to dominate or reject them, and strong motivation to maintain self-autonomy and to actualize their potentials.[3]

Edward Shoben believes that the model of integrative adjustment is characterized by "self-control, personal responsibility, democratic social interest, and ideals. . . ."[4] Jourard, [5] Scott,[6] and Tindall[7] also give descriptions of the normal personality.

Not all normal persons are alike. While they have some traits in common, they also vary tremendously. Individuals experience a process of socialization similar in many respects, but they also experience a process which is very unique. Socialization helps explain both convergent and divergent personality characteristics.

Learning theory says that socialization is a learning process. According to this theory, the type of personality an individual develops will be determined to a degree by the type of culture of which he is a part. Thus, normality may differ from one culture or society to another.[8]

Martin and Stendler state the problem involved in the formulation of a basic personality in a complex society. The goals of socialization are not concepts agreed upon.

> It is difficult in a society as complex as ours to describe a set of goals of socialization which are accepted by all segments of the population . . . . a number of social scientists have considered the question of "the American character," or basic personality. On the basis of these studies, we can make some tentative statements about the kind of adult the American child is expected to become. These goals of socialization apply, of course, only to a "typical" American. In kind, degree, and number, goals vary from person to person, from group to group. We cannot assume that any particular adult, or any particular sub-group of adults, accepts these goals, or that all who accept them do so to the same degree and define the behavior that satisfies them in the same way.[9]

THE NATURE OF THE PROBLEM

The nature of the problem to be dealt with in this present study involves the religious personality. Specifically it involves the question as to the personality similarities and differences of students from a religious college and students from a state college.

The problem was first suggested by Merl E. Bonney who did a descriptive study of the normal personality.[10] In his study he selected a group of highly normal individuals. In this present study a similar procedure was followed. A group of highly normal individuals was selected from a religious college and compared with their corresponding group from a state college.

The comparisons were made on the basis of certain measurements. In this way, the personality differences and similarities emerged between these select groups.

On the basis of prior research it is evident that the religious individual varies from the general population along certain personality dimensions. A general survey of this research will now be given in order to supply this present study with some perspective.

RELATED LITERATURE

Prior research has shown the religious person to differ from the non-religious. Gregory, in his research, demonstrated that the religious personality rated high on the California F Scale for Authoritarianism.[11] In another study it was shown that high authoritarians exhibited fear, suspicion, and moralistic condemnation of strangers. Meanwhile, they glorified their own virtue and ability.[12]

Bateman and Jensen have concluded that persons with extensive religious training tend to express less anger toward the environment and are more apt to turn it upon themselves.[13] Cattell and Stice found priests to be more simple and unpretentious than sophisticated and polished, more confident and self-secure than timid and insecure, more conservative than radical.[14] Symington has concluded that religious beliefs are negatively correlated with intelligence.[15]

A questionnaire designed to measure prejudice toward Catholics, Protestants, and Jews was given to 125 under-graduates. Half of them belonged to religious clubs. The results showed that students who belonged to religious clubs were more anti-Semitic than students who did not belong to such clubs.[16]

Sunday School attendance and religious affiliation have not been found to be significant factors in predicting social acceptability. Caves found that sociometric data obtained from the six grades of an elementary school failed to differentiate the Sunday School student from the absentee.[17] Bonney found that in twelve elementary school classes and among 1100 students at a state university, church affiliation was not correlated with social acceptability. His conclusion:

> Until contrary evidence is available, teachers and counselors had best assume that all of our major religious organizations, in spite of their differences in doctrine and practice, are turning out very much the same caliber of people in so far as this caliber is measured by desirability as associates by age-mates in school.[18]

Dreger found the religious persons he studied were conforming and ego defensive while the non-religious persons were more independent.[19] Martin and Nichols gave this summary of their findings concerning the religious person:

> In general, then, we receive a generally negative picture of the religious believer. He is a conventional, conforming person to whom being socially acceptable means a great deal. He is rigid, prejudiced, unintelligent, suspicious, and generally pessimistic. Surprisingly, the religious men seem to be more masculine than the irreligious.[20]

SELECTION OF SUBJECTS

The subjects for this present study were selected from the student bodies at a southwestern state university and a religious college. The state university is a state supported school of approximately 10,000 students. It has an extensive undergraduate program of studies and graduate divisions in some departments.

The religious college is a private religious school of approximately 200 students. It is strictly an undergraduate institution, denominationally unaffiliated, and fundamentalist in doctrine. At the state university the subjects were selected from students in psychology classes on the sophomore, junior, and senior levels. The students were not necessarily psychology majors. At the religious college the subjects were selected from students who were taking at least twelve credit hours regardless of classification.

The procedure for selecting the subjects for this study was the same in both schools. It consisted of the procedure suggested by Bonney[21] in which students rate their classmates. At both schools a list of the students from which the subjects were to be selected was prepared. Each student was given a copy of this list along with a sheet of instructions and a rating scale.

The students were asked to rate on the rating scale those students whom they knew fairly well. They were to rate them as to their normality on the basis of the criterion given in the instruction sheet. The instruction sheet mentioned five general characteristics of the normal personality. For example, a person with high psychological health is one who (a) typically is energetic and characterized by feelings of well-being or happiness, (b) typically makes friends easily, enjoys the company of others, and is well liked by most others, (c) typically has goals and works efficiently toward achieving those goals, (d) typically is not unduly critical of others nor of self, and (e) typically guides his or her behavior by sound judgment, is able to make constructive decisions and to act upon these decisions.

A student's final standing was determined by calculating the frequency of his above normal and below normal ratings and then substracting them. From the data obtained in the rating procedure twenty-five above normal individuals were selected from each school. These groupings composed the upper twelve percent of the tested population at the state university and the upper thirty percent of the tested population at the religious college. The twenty-five students who were considered above average in normality were those who received the most student nominations.

Prior research has shown that the religious individual is more conforming, ego defensive, rigid, prejudiced, suspicious, and generally pessimistic.

INSTRUMENTS OF MEASUREMENT

The following three instruments of measurements were used: (a) the *Sixteen Personality Factor Questionnaire;* (b) the Child Development Scale; and (c) the Personal Data Questionnaire.

The *Sixteen Personality Factor Questionnaire* (16 P.F.Q.) was developed by Raymond B. Cattell and Glen F. Stice. It consists of 187 questions (Form B) to which the testee responds. According to the handbook which explains the questionnaire:

> The 16 P.F. is the psychologist's answer, in the questionnaire realm, to the demand for a test giving fullest information in the shortest time about most personality traits. It is not merely concerned with some narrow concept of neuroticism or "adjustment," or some special kind of ability, but sets out to cover planfully and precisely all the main dimensions along which people can differ, according to basic factor analytic research. The present questionnaire meets a long-standing demand.[22]

The Child Development Scale consists of thirty items taken from the Parent Attitude Survey devised by E. J. Shoben, Jr.[23] The original scale contained eighty-five items, seventy-five of which were arranged into three subscales: the Dominating Scale, the Possessive Scale, and the Ignoring Scale.

The thirty items of the abridged scale used in the present study contained an equal number of dominating, possessive and ignoring items. The subject was asked to rate each item of the Child Development Scale on a five point scale ranging from "strongly agree" to "strongly disagree."

The Personal Data Questionnaire was constructed by Merl E. Bonney. It contains questions of a personal nature about the subject. The information provided in this questionnaire was used to shed further information on the subjects of this present study.

RESULTS WITH CATTELL'S 16 P.F.Q.

Cattell's 16 P.F.Q. contains the following sixteen factors which are scored along a ten point scale from one extreme to the other:

*Reserved–Outgoing
Less Intelligent–More Intelligent
Affected by Feelings–Emotionally Stable
*Humble–Assertive
*Sober–Happy Go Lucky
*Expedient–Conscientious
Shy–Venturesome
Tough Minded–Tender Minded
Trusting–Suspicious
Practical–Imaginative
Forthright–Shrewd
Placid–Apprehensive
*Conservative–Experimenting
Group Dependent–Self Sufficient
*Casual–Controlled
Relaxed–Tense

The highly normal students from the two colleges when compared on the 16 P.F.Q. showed a reliable difference on the above traits preceded by an asterisk. On the other ten traits there was no significant differ. (Significant differences are reckoned from the .05 level of significance.)

Cattell and Stice discuss in detail the sixteen factors measured by the 16 P.F.Q. The following explanation of these factors will be taken entirely from the *Handbook for the Sixteen Personality Factor Questionnaire.*[22] Only those six traits which showed a significant difference will be discussed.

The state university students were more outgoing while the religious college students were more reserved. The outgoing person is typically good natured, easy going, ready to cooperate, attentive to people, softhearted, kindly, trustful, adaptable, warmhearted, and sociable. Reserved people tend to be grasping, critical, obstructive, cool, aloof, hard, precise, suspicious, rigid, and cold.

In the humble–assertive factor, the religious college students were more humble while the state university students were more assertive. This factor is the well-known one of dominance which has been investigated by Maslow, Allport, and others. The humble person is submissive, dependent, kindly, expressive, conventional, easily upset, self-sufficient and mild. The assertive person is aggressive, competitive, independent minded, self-assured, hard, stern, solemn, unconventional, tough, attention getting and dominant. Whether this factor is the same as the Christian virtue of humility may be questioned. However, if it is, perhaps this explains why the religious students were more humble than the secular ones.

The religious college students were more sober while the state university students were more happy-go-lucky. The happy-go-lucky person is enthusiastic, talkative, cheerful, serene, frank, expressive, quick and alert. The sober person is glum, serious, silent, introspective, depressed, concerned, brooding, incommunicative, smug, languid, and slow. Happy-go-lucky individuals have generally had an easier, less punishing, more optimism-creating environment, or they have a more happy-go-lucky attitude through less exacting aspirations. In the latter case it might be expected that a religiously directed student would be more sober than a non-religious person due to more exacting religious aspirations.

The expedient–conscientious factor is characterized most by energy and persistence. The religious college students were more conscientious while the state college students were more expedient. To be conscientious is to be persevering, determined, responsible, emotionally mature, consistently ordered, attentive to people, persistent, and to have character or super-ego strength. To be expedient is to lack rigid internal standards, to be casual, undependable, quitting, fickle, frivolous, demanding, impatient, relaxed, indolent, and obstructive. On the whole it would seem that this factor best depicts the regard for moral standards, the tendency to drive the *ego* and to restrain the *id,* which are most frequently regarded as marks of the *super-ego.* It is well known that religious people are *super-ego* controlled. It might be expected that the religious college students would be more conscientious than the state university students.

The state university students were more experimenting while the religious college students were more conservative. Experimenting persons tend to be radical, well-informed, inclined to experiment with problem solutions, and less inclined to moralize. The conservative theological position of the religious college students might serve as a basis for expecting them to lean toward conservative trends. Priests have been shown to be more conservative and, if generalization is possible, the religious student might be expected to be conservative.

The state university students were more casual

while the religious college students were more controlled. The casual person is uncontrolled, lax, and has poor self-sentiment formation. The controlled person is strong in will-power and has self-sentiment formation. The controlled person shows socially approved character responses, self control, persistence, foresight, considerateness of others, and conscientiousness. It might be expected that the religious student would be more controlled in his attitude since religion provides standards, mores and external regulations.

RESULTS WITH THE CHILD DEVELOPMENT SCALE

The Child Development Scale consists of thirty statements to which the student responds. It has ten statements for each of the three dimensions in the scale. These three dimensions are: possessive, dominating, and ignoring. The Child Development Scale revealed significant differences between the students of the two colleges.

The religious college students were more possessive, dominating and ignoring than the state university students. On the Child Development Scale a possessive student would agree with an item like "Babies are more fun for their parents than older children." A student scoring high on the dominating scale would agree with such statements as "It is wicked for a child to disobey his parents" or "A child should always believe what his parents tell him." A sample item in the ignoring category is "Children should not interrupt adult conversation."

A religious person adheres to a more structured life than a non-religious person since he has an external standard to which to relate. It is a very authoritative standard. It is not surprising that this frame of reference would tend to influence his attitudes about child rearing.

versity students came from families with an average of 2.64 children; the religious college students came from families with an average of 3.2 children. Only one state university student had divorced parents while three religious college students' parents were divorced.

In reference to the person most admired, looked-up-to or emulated in some way, more religious college students listed a minister. This would be expected since religious students would more likely identify with a religious figure. More state university students listed a college teacher, but this was not statistically significant.

Surprisingly, more state university students attended religious services regularly while growing up than did the religious college students. The comparison was twenty-two to twenty-one. Nineteen religious college students considered the desire to please parents highly motivating while fifteen state university students did. These differences were not statistically significant.

Significant differences were found in two aspects of motivation. Twenty-one religious college students were highly motivated to serve others while 13 state university students said that they were. This would be in keeping with the humanitarian aspects of religion. Also, 25 religious college students, compared to eight state university students, were highly motivated to live up to their religion.

SUMMARY AND CONCLUSIONS

Prior research has shown that the religious individual is different from the general population along certain personality dimensions. The religious person is more conforming, ego defensive, rigid, prejudiced, suspicious, and generally pessimistic.

This study was conducted to determine in what ways students at a religious college and a state university are similar and dissimilar. In order to answer

Religious College Students	*State University Students*
Reserved	**Outgoing**
Humble	**Assertive**
Sober	**Happy-Go-Lucky**
Conscientious	**Expedient**
Conservative	**Experimenting**
Controlled	**Casual**
More possessive	**Less possessive**
More dominating	**Less dominating**
More ignoring	**Less ignoring**

RESULTS WITH THE PERSONAL DATA QUESTIONNAIRE

The Personal Data Questionnaire revealed supplementary information about the two populations. Part of the information obtained from the questionnaire will be discussed here.

The state university students comprised nine males and sixteen females. At the religious college the students were made up of ten males and fifteen females. Six of the state university students and five of the religious college students were married. The state uni-

this question students were chosen on the basis of student nominations from the two colleges. At the religious college twenty-five students were put into the category of above normal in personality and the same was done at the state university. After these groups were formed, the above normal students at the religious college were compared with the above normal students at the state university.

On the basis of the *Sixteen Personality Factor Questionnaire,* the religious college students were more reserved, humble, sober, conscientious, conservative, and controlled. The state university students were more

outgoing, assertive, happy-go-lucky, expedient, experimenting, and casual.

In reference to the Child Development Scale the religious college students were more dominating, possessive, and ignoring than the state university students.

The Personal Data Questionnaire revealed that religious college students to a greater degree than state university students admired a minister and that religious teaching was a very important motivation in their lives. Significantly more religious college students than state university students felt the desire to perform some service to help others was highly motivating.

It would be a mistake perhaps to generalize the results of this study to all religious college and state college students. However, some interesting questions are raised by this study. Do students go to a religious school because they have certain personality traits or do they acquire them as the result of their affiliation with the religious school? Perhaps both possibilities are true to a degree. Another question to ponder is whether a religious person attending a state university would differ significantly from students at a religious school.

A very crucial question is whether the religious students studied in the present research have the traits which will enable them to function efficiently in the vocation to which they feel called. Is the type of religious student pictured in this study the type individual who is best equipped to handle the discipline of religious work?

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The gospel of Humanism invites men to make the best of a bad job. The world is ultimately pointless. All we can do is to try to give it a few temporary points before we pass into the abyss of nothingness. The ancients said: Eat, drink, and be merry, for tomorrow we die. The Humanism of the sixties has become more sophisticated. It allows man to be serious in his merry-making. The image is new, but the basic idea is the same. Life has no meaning than that which we give it ourselves, and no other end by death. This in itself is not an objection to Humanism. For this view of life is perhaps the best we can do, if we assume that God does not exist and that he does not care for the world. It is better to face the facts and recognize that this is the only valid alternative to Christianity than to pretend that there are various intermediate options open to us.

Colin Brown
Philosophy and the Christian Faith, Tyndale Press (London), 1969, p. 230

God and the Universe

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Proposition

The proposition I propose for consideration is quite simple: *God sustains all of nature not only by guaranteeing its existence but by maintaining the very characteristics, functions, and interrelationships of its parts.* Or, to quote John Calvin,

> Even inanimate things, whatever natural properties they may possess, are merely instruments, the efficacy of which is maintained by God and used by Him to fulfill the purpose of His own will. . . . He . . . so rules all things that nothing happens but according to His counsel.[1]

Perhaps I am outCalvining Calvin. I wouldn't even have said, "whatever natural properties they may possess." My contention is that salt is salty, sugar is sweet, lemons are acid, and gall is bitter because God continually maintains each characteristic in relation to whatever chemical make-up He originally determined should be salt or sweet or acid or bitter. A ship floats, not because it has displaced water equal to its own weight, but because God sustains it at that point.

God is the Only True Cause

Some philosophers of science still insist that 'cause and effect' is an unacceptable, metaphysical concept. Certain sequences of events tend to cluster in a predictable order. The clustering is significant; the description, however, must be in terms of sequences of events without presuming a metaphysical relationship. Yet even those who hold that view recognize that there is a difference between the sequence leg movement–ball contact–ball movement and day–night. The first is a direct sequence; the second is the consequent of prior sequences which converge. My thesis here is that all sequences are consequent sequences or, in other terms, God is the only true cause.

Even with a one cylinder engine we are incapable of directing manually the spark at the proper time, so we build into the machine the means of providing it automatically. God is not so limited. He provides the appropriate spark at the right time to all the cylinders of all the engines, including those of the thunderstorms. He is the only true cause when an engine runs (or doesn't). "Except the Lord build the house, they labor in vain that build it." (Psa. 127:1)

> [I must interrupt at this point to make an explanation in order to avoid immediate rejection of the thesis. The above paragraph in no sense implies that the only proper means of making a balky engine start is to blame God and attempt to persuade Him to straighten things out. There is hidden within it, however, the implication that simply to dismantle, check, correct, and reassemble the engine is to miss an important part of reality, even if the engine then runs like a top. The implications are even more urgent (because more immediate and personal) when caught in rapids in a swollen river and the motor misses. (Never before, nor after, in four days travel did that decrepit outboard miss and keep going.) At that moment I felt prayer was not simply making the best of a desperate situation but a real appeal to the Cause to so order natural sequences (not simply to intervene in those sequences) that a given useful result could be brought about.
>
> The concept of God as immediate cause in no sense eliminates nor prejudices (for me at least) the multitude of equations which science has found useful in describing and predicting physical reality. These equations or 'laws' simply demonstrate that God is neither changeable nor arbitrary. He maintains nature consistently.[2] It also demonstrates that God has established internal consistency within the natural universe.]

It must be pointed out that I find it easier to state and discuss the proposition that God maintains both the existence and functions of nature if the cosmos is approached from a purely mechanistic viewpoint. But it is no less true, and perhaps less difficult to imagine, that the proposition applies equally well within the principle of indeterminacy, particularly at the boundaries of the macrocosmic and the sub-microscopic. It is God's immediate support of nature that makes and keeps it what it is and how it functions. Probabilities are definable because God sustains the phenomena upon which the probabilities are based. This should be kept in mind even though not specifically referred to in the remainder of the discussion.

Evolution and Genesis

About the time this concept was beginning to form for me I was asked to address a Bible Class for university students on the topic of evolution. The essence of the address was: Genesis 1 seemed to me to imply rather inequivocally that God was instrumental not only in the original creation of matter but in its further refinement and subsequent appearance of specific phenomena. Granted the apparent validity of the evolutionary apparatus, there were two crucial problems which made me continue to suspend judgment concerning it in the light of my understanding of Genesis 1. (1) I was completely unsatisfied with any theory of a sufficient dynamic to account for the present resultants of the initial protozoa. Natural selection can only destroy, never create. Mutations are predictably detrimental. (2) Completely apart from any 'missing link', I was impressed by crucial gaps in reconstruc-

tions. Until these two could be resolved I felt the burden of proof still lay with the evolutionists, again in the light of my understanding of Genesis 1.

> [I interrupt again to admit I am a bit nonplussed at Dr. van de Fliert's implication (to me, at least) that our understanding of Scripture should have no bearing on our view of science (*Journal ASA* 21, 69 (1969)). The infinitesimal knowledge I have of the subject of geology fits Dr. van de Fliert's contentions rather than those of Morris and Whitcomb, Jr.; nevertheless I hesitate to find fault with the idea of the latter attempting to make one's 'science' agree with one's understanding of Scripture. I think it most healthy that such attempts be made and if they don't hold water that they be debunked. At the same time I agree with van de Fliert that if we are more convinced of the reliability of God's Word when we manage an agreement between 'science' and 'Scripture', then our faith is misplaced.[3] The purpose for which attempts at agreement are undertaken is crucial. If it is to 'prove' the validity of Scripture, then one is attempting to build his house on sand; this I presume is Dr. van de Fliert's contention. However, if one has assumed that the scriptural (eternal) and natural (temporal) universes are interlocking then the points of interaction are valid subjects for study. This is what I understand Morris and Whitcomb, Jr. attempted to do, and failed in their explanation. It is what I am attempting to do here, and would like to know if I also have failed.]

A Satisfactory Dynamic

One of the by-products of reckoning God as actively maintaining nature not only in existence but in its characteristics, functions, and inter-relationships, is that I find a satisfactory dynamic for both the myriad dead-end or truncated developments in the evolutionary scheme, as well as the trunk-line or central ones. God willed and directed each to its predetermined end. The gaps also may or may not eventually be filled in. They need not be if God's hand (through whatever natural or supernatural means He may have chosen) has been responsible for some *de novo* development. The self-consistent nature of the physical universe implies that eventually some scientist will discover some apparent 'cause' which adequately cares for the apparent evolutionary sequences. What is accomplished here is to give an adequate rationale for Genesis 1.

I speak of the above as a "by-product" only that the original proposition may not appear (as in fact it was not) a theory whittled out to explain Genesis 1 and evolution. On the contrary, its implications are presented exclusively as one point at which the usefulness of the concept seems to be borne out.

The implications of this concept with regard to prayer have been touched on earlier. The implications in relation to faith, daily walk, the study of science, etc. can only be appreciated as experienced. For me it has injected a vital ingredient into my relationship with God.

An Objection

One of the first objections I had to this idea was that it was so Unnecessary, with a capital U. A mechanistic theory of nature is sufficient in and of itself. To infer something beyond it can be like taking a heading from the north pole: all routes point south. One unnecessary theory is as likely or unlikely as another. They all, being equally unnecessary, point south, away from the Necessary. I believe the above is fallacious, however, and that the illustration should rather be that of actuality and reflection. And I would venture that a purely mechanistic theory of nature assumes that what the scientist studies is the actuality and that to speak of a reflection is superfluous, unnecessary. I believe nature is rather all reflection and to assume it is not is to misunderstand God (the eternal reality) and the essential nature of the natural, as a reflection. "The heavens declare the glory of God and the firmament showeth his handiwork," (Psa. 19:1) not only in original creation but in constant sustaining and maintaining activity.

God Himself is the great Unnecessary in a completely mechanistic universe. Nowhere does God force man to accept His existence or intervention, though neither can atheist nor agnostic please Him: "he that cometh to God must believe that He is and that He is a rewarder of them that diligently seek Him." (Heb. 11:6)

A ship floats, not because it has displaced water equal to its own weight, but because God sustains it at that point.

Unnecessary vs. Prevaricating

I also initially rejected this concept because of its similarity to an untenable (to me) theory. When I was presented with the possibility that God had created the earth with ready-made fossils, geological strata, etc. I rejected it outright. That God should deliberately create a prevarication, i.e., an apparent but untrue historical depth, with the intent of leading mankind away from the truth, is to me completely contrary to all that the Scriptures tell us of the character of God. On the other hand, as I continued to observe the implications of the present thesis both in Scripture and in nature I began to see an important difference between the Unnecessary and the Prevaricating. The former is typical of all that requires faith, the latter is contrary to all that faith stands for.

Perhaps I have, through years of probing the possibilities of this idea, allowed my concept of God, nature, and Scriptures to be swayed by it. The end result is a greater satisfaction in the intertwining of the implications of our Christian faith and the hard facts of day-to-day living. One of these subtle shifts in focus or viewpoint is that I see nothing blasphemous or belittling to the glory of God to conceive of Jesus having done His miracles through means which were perfectly 'natural' though perhaps not understood by us. Not that *fiat* miracles are out of the question, but that they would be no greater acts of God than those He continually does in the functional maintenance of nature.

Neither do I find the possibility of man's 'creating' life to be such a hair-raising thought.[4] I see so many other phenomena which God brings into being and maintains in function through apparently natural means that I find it almost the expectable thing that life itself (mortal life, that is) is a derived characteristic mechanistically formulatable in nature, but reflecting God's maintenance of life-giving characteristics in those chemical combinations.

Is God to Blame?

Another problem in the present thesis is that the logical corollary of such a supra-mechanistic thesis is that God ends up to blame for all of earth's evils, not only acts of God (*sic*) but the very chemical activities involved in our sins. I cannot say at the present moment that I have any really cogent answer to this problem.[5] The deeper I go into the problem of sin the more anomalous it becomes. It cannot be reasoned or explained. It simply is. The existence of other beings made in the image of God, with His power of independent action, I am sure is the basic fact. But why anyone should, in a state of innocence, choose to abuse that power is inexplicable. The dicta of anthropology and hamartiology (as sections of doctrinal study) have left me as yet unsatisfied on this point. Neither am I impressed by Aquinas's relieving God of responsibility through a sequence of secondary, tertiary, quaternary, etc. intermediate cause and effect steps separating God from the final act and thus allowing for slippage in the process. It was God's original and highest creation that first sinned (whether you wish to refer to Lucifer or Adam). Furthermore, a perfect first cause does not permit anything but a perfect second, third, fourth, etc. sequencial causes, unless some 'grammar' of error is built in purposely.[6] I have no complete answer as yet. Maybe some reader does.

Summary

An illustration may suffice by way of summary. Our proposition is that reality is like a picture puzzle. The natural corresponds to the shape of the pieces, the supernatural (God's activity in nature) to the picture. Scientists who are unwilling to grant the supernatural go to great pains to show that the puzzle can and must be put together on the basis of shape alone and that often the color can lead you to try to put pieces together which don't fit. Those who know God personally recognize that the picture is the important part of the puzzle and that the shape of the pieces is subservient to the design. Two pieces of identical shape, one grass, the other sky, are interchangeable in terms of shape alone but in terms of design there is only one possible way in which the pieces could go. Unfortunately Christians have all too often assumed we knew inequivocally what the design was and therefore forced certain pieces in order to make the picture turn out as we envisioned it. There are times when we must put the most unlikely colors together because the pieces fit only that way. I am convinced that the picture will make sense, though maybe not the sense we now envision. In the meantime, we cannot assume that simply putting pieces together without reference to the design is the 'whole picture.' That God works in nature all Christians are aware. That He actively is the total cause of all that happens in nature has been implied, skirted around, wondered at, but to my knowledge never explicitly expressed in this manner before, unless this is what Paul was referring to when he told the Athenians that "in Him we live, *and move,* and have our being." (Acts 17:28)

That God should deliberately create a prevarication, i.e., an apparent but untrue historical depth, is to me completely contrary to all that the Scriptures tell us of the character of God.

FOOTNOTES

[1]John Calvin, "On the Creation of Man" in David Otis Fuller, editor, *Valiant for the Truth,* McGraw-Hill Book Company, Inc., New York, 1961. Page 191.

[2]An apparent implication of this, though not a necessary one, is that the physical universe is as it is because, given God's character and His design for man, it could only be as it is; it is not arbitrary in its mode and functioning.

[3]I cannot for myself completely compartmentalize science and Scripture. When the inevitable showdown takes place one extreme "demythologizes" the Scripture (by which they mean "make it all myth") and the other extreme simply redefines "true science" as that which is compatible with their understanding of Scripture. The rest of science is hated and feared. Furthermore, life is inescapably lived within the milieu of nature. Cloistered attempts at finding God partake of all the drawbacks, and certain of the advantages, of any high degree of specialization: a useful revealing of a part and corresponding distortion of the whole, like looking through a magnifying glass. Life lived in the world must take into account the impact of Scripture on our understanding of nature if we are to properly orient ourselves both to God and to nature without distorting our understanding of either.

[4]What is to me truly hair-raising is the concept of man developing absolute control of another's mental faculties, whether through transplantation or through servo-electronic control. The only explanation I have that God should permit man this capacity which He Himself will not accept is that there is a similar (not identical) relationship between a man's spiritual being (what is *him* after death) and his body as between God and nature: man uses his body to express that true (though separate) inner self, even as God expresses certain facets of Himself through nature. We who are so used to receiving our impulses from our physical, including mental, stimuli, yet thinking "This is me reacting," would probably find it quite impossible at first to distinguish the electronically induced stimuli from self-induced stimuli. I have been attempting during the past few years to observe and distinguish the various sources of inner and outer stimuli for my daily actions. What is of God's Spirit, what is of my spirit, what is purely biologically determined, what are externally coercive stimuli; through what channels do the externally coercive stimuli enter to the will and go out again to the motor reflexes? Some of it is, I am sure, simple mental reflex since the will is trained toward such a reflex, like becoming angry when your face is slapped. This "research" hasn't lessened the horror of such direct external control as made possible by the development of modern science, but it has given insight into some far-out possible uses of such a catastrophe in the life of a practiced, Spirit-controlled inner man. The end result, as I imagine it, of a Spirit-controlled inner man having his nervous system (and through it his body) electronically controlled by some outside influence is that he would eventually learn to detach his inner self from his mental apparatus in a kind of living death. All speculation, of course.

[5]C. S. Lewis in *The Problem of Pain* explains the necessity of nature to be as it is, allowing for pain and evil. The necessity alone, however, does not disengage God from being implicated in pain and evil. "For it must needs be that offences come; but woe to that man by whom the offence cometh!" (Matt. 18:7) That He uses pain and evil for good in the lives of those who will it to be so is much closer to the answer for me.

[6]I have explored this possibility of a grammar of error more fully in an essay published in a limited, multilithed, edition: *Multivac I.* It, along with other essays, is available on request.

Further problems faced in the application of this supra-mechanistic concept of nature but not treatable in full here include the following.

A corollary to the problem of God's being implicated in

Our proposition is that reality is like a picture puzzle. The natural corresponds to the shape of the pieces, the supernatural to the picture.

the evils in nature is that it appears to relieve us of responsibility for our actions. This is only slightly easier to answer. At the very least we share the responsibility. And I am sure the righteous judge will accuse only to the extent of responsibility. We are therefore to be cautious about irresponsible actions. But this does not explain the problem of having a judge who is also co-defendant. This part of the problem is the stickler in the above paragraph. It does not get *us* off the hook, however. We are responsible and must answer for sin either directly or through Christ's sacrifice.

A further corollary to the proposition as a whole deals with the age old problem of free will versus God's sovereignty. The present supra-mechanistic theory of God in nature has forced me into a rather considerable rethinking of this problem. It would take another full length article to treat clearly but I think now the answer lies in a concept of eternity, not as endless continuation of space-time, but as a different mode of existence in which all events are in some sense continuously Present, so that Christ is truly slain (in the eternal mode) before the foundation of the world (in the temporal mode). This is coupled with a definition of free will as "the ability to interact in the eternal mode in such a manner as to leave a unique impression upon it." Without what we in time call free will, we would be incapable of making our unique impression on eternal reality. This does not nullify God's sovereignty. He simply orders eternal reality in such a way that it takes all of our impressions upon eternal reality and weaves them into the accomplishment of His eternal purposes. This is true whether we be sons of God or Belial, whether we be led of the Spirit or of spirits.

One more time . . .

General Evolution and the Second Law of Thermodynamics

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The idea that the General Theory of Evolution and the Second Law of Thermodynamics are mutually contradictory is an error based on the failure to recognize that the Second Law allows parts of the universe to decrease entropy (increase order) while requiring that the total amount of disorder in the universe must always increase. Thus the Second Law cannot be used against Evolution, although the distinctly different argument from mathematical improbability is legitimate.

Wilder-Smith

The idea that the Theory of Evolution defies the Second Law of Thermodynamics appears to be making an impression in some circles. I do not know the full history of the idea, but I first encountered it as an excerpt from A. E. Wilder-Smith's book *Man's Origin, Man's Destiny*[1] which was published sometime ago in *Christianity Today*. That excerpt drew accurate fire from a collection of physicists and engineers who correctly indicated that a complete misunderstanding of the "law" was involved. Despite authoritative criticism, Dr. Wilder-Smith still apparently retains his position.

The *Journal ASA* 22, 117 (1970) contains a review by a chemist of Wilder-Smith's book. I was disappointed to note that this argument was mentioned with tacit approval. A biologist, in the same issue, also notes the idea with more cautious approval.

I no more concur with the General Theory of Evolution than any of the proponents of this view, but it is a mistake to defend oneself with faulty arguments. I hope to show why this view is faulty. It is then the reader's responsibility to face the truth honestly and act accordingly. There are significant questions of the meaning of theories and laws which could be raised, but the basic issue to which I wish to speak involves the internal consistency of scientific thought. Thus, I shall by-pass some philosophic difficulties and deal only with the central mistake.

Not Technical

The mistake is not at all technical. Ordinarily the

Second Law is stated, "The amount of disorder in the universe always increases or remains unchanged for any process." Technically, one substitutes the word "entropy" for "disorder", but the correspondence is sufficiently close that no confusion will result from using "disorder". Also technically, the case where disorder does not change is probably physically unrealizable and certainly it refers to cases (which are of no interest to us) where interacting systems are in equilibrium so that no changes at all take place. Thus, we can state the law, "The amount of disorder in the universe increases for all processes", and be reasonably confident that we are making scientific sense. The error lies in overlooking the *absolutely crucial* phrase "in the universe". Let me give an example of how crucial this is.

Cooling Water

A warm glass of water can be cooled by placing it in a refrigerator. If you looked only at the water, you would have to conclude that the Second Law had been violated. How so? The agitation of the molecules (which is related to temperature) decreases with decreased temperature. Thus the entropy (disorder) of the water *decreases*. For any given temperature change and quantity of water, this entropy decrease can be precisely calculated. How can this be if the law demands an increased entropy for all process? The answer is that you have forgotten to look at the rest of the "universe". The *decrease* of disorder in the water is *more than cancelled out* by the *increase* in disorder in the molecules of air outside the refrigerator. The refrigerator pumps heat into the ouside air causing a large increase in the entropy of the room. The point then is this: Improperly limited parts of the universe do not necessarily obey the Second Law of Thermodynamics. The Law is followed only when a sufficient part of the universe is included.

If we are to believe that General Evolution contradicts the Second Law, we must then also conclude that all living organisms continually violate the Law.

Freezing Lake Michigan

It may be argued that my example was an artificial process and that evolution is supposed to be natural or operative without human intervention. Then let me choose another example. It can hardly be denied that Lake Michigan undergoes a yearly entropy change. Every winter large quantities of ice are formed. The total entropy changes involved are many times greater than those for the glass of water, yet they still involve only the cooling of water. I do not anticipate disagreement when I say that this is as "natural" a process as can be desired. Yet here again, if only the entropy change of the lake upon freezing is noted, you will conclude that you see a violation of the Second Law. Again, if attention is given to the changes in the atmosphere, differences in radiation received from the Sun, infra-red radiation from the Earth etc., the Second Law will be found to hold true.

Protein Molecule

Therefore, we must conclude that an evolutionary process which creates an *isolated* area of decreased entropy (increased order) does not at all defy the Second Law of Thermodynamics. If we include all involved systems, we will see that the law holds. The hypothetical case of a protein molecule formed in a thin "broth" of "organic" materials by evolutionary processes can serve as an example. The molecule is a much more ordered situation for the atoms which form it than that in which they previously existed. But the disorder of the "broth" will *increase* when the molecule is formed and its increase will more than compensate the decrease due to the formation of the molecule.

All Living Organisms

It should be noted that the processes of all living organisms are processes of organization. Thus, all living organisms are continually *increasing* the order of the molecules and atoms which they take in for nourishment. If then we are to believe that General Evolution contradicts the Second Law, we must then also conclude that all living organisms continually violate the Second Law. Both conclusions are, of course, erroneous. Nevertheless, this continual, large scale, ordering in a universe which is supposed to be running down is sufficiently curious to have arrested the attention of a few physicists. At least one theoretician has made an attempt to explain this in terms of quantum mechanical models.[2]

Mathematical Improbability

The argument from the Second Law is sometimes confused with the argument from mathematical improbability, but they are, in fact, distinct. The general theory of Evolution is a fantastically improbable theory in a mathematical sense and I think this is an important weakness. I know of no other theory which at all approaches the improbability of General Evolution. Unfortunately, the argument from the Second Law of Thermodynamics is not in the same sound position.

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But then with me the horrid doubt always arises whether the convictions of man's mind, which has been developed from the mind of lower animals, are of any value or at all trustworthy. Would any one trust in the convictions of a monkey's mind, if there are any convictions in such a mind?

Charles Darwin
Letter to William Graham, July 2, 1881, Down, in *Life and Letters* I, 285

Now I wouldn't say that . . .

REACTION AND REBUTTAL

"THE DYING OF THE GIANTS"

(*See* Journal ASA 22, 91 (1970))

William A. Springstead, Pinedale, Wyoming

The implications of a world wide deluge, occurring within the last 10,000 years, are thought provoking. Its existence would, of necessity, call for a critical reappraisal of some long esteemed scientific theories. Notwithstanding the dilemma, if substantiated, scientists should follow Erhard Rostlund's dictum: "The task is to search for the truth wherever it is."

I stated: "objective appraisal of the nature of the Pleistocene, of necessity must modify any *undeviating* quietistic views of uniformitarianism." Evidently Dr. Cuffey does not concur that the Pleistocene epoch was different from past geological epochs. At least not different enough to make an exception to uniformitarianism as a "scientific way of operating." Evidently there are fellow scientists who would differ with him.

If "The Dying of the Giants" creates enough discussion to provoke some trained scientists to further research, I will obviously be amply rewarded.

James R. Beerbower writes: "Uniformitarianism, therefore, is a working principle essential to paleontologists, but not an invariable rule or scientific law."[1] G. G. Simpson elucidates: "Some processes (those of vulcanism or glaciation for example) have evidently acted in the past with scales and rates that cannot by any stretch be called 'the same' or even 'approximately the same' as those of today."[2] Another author concurs: "It must be admitted that movements (earth) in the past must have been very different from those of the present day, and that it is debatable how far past events can be accurately reconstructed from the present day. Few geologists would care to enter the

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Roger J. Cuffey, The Pennsylvania State University, University Park, Pennsylvania

The extinction of some large mammals toward the end of the Pleistocene Epoch suggested to Springstead (1970) that a world-wide deluge or flood was a reasonable scientific possibility; however, a number of facts contradict his conclusion (Cuffey, 1970). Springstead's present rebuttal requires further comment, although my earlier critique (Cuffey, 1970) adequately treats some of the points which he raises as well as his general methodology in these matters.

My "seeming refusal to agree with numerous authorities" about when the Pleistocene extinctions occurred is readily explained. Simply stated, when seen in the entire context of the paleontologic literature regarding these matters, Springstead's quotations mean something very different from what he interprets them to mean. Such unintentional misinterpretation frequently affects the output of any of us when working outside his own immediate field of expertise and specialization (Cuffey, 1970, p. 93, insert).

I echo Springstead's call for further research, but urge those heeding this call to concentrate their efforts in directions which break new ground in this field, rather than in the direction of trying to revive defunct and erroneous ideas.

The Pleistocene extinctions are only part of the over-all history of life, world-wide, during the last several million years of the Cenozoic. They must therefore not be treated in either temporal or geographical isolation, but must be considered in relation to events transpiring from Miocene time onward and occurring in Europe and Africa as well as in New Zealand and perhaps North America. In particular, I wish further to emphasize the fact that extinctions occurred through-

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Springstead

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lists decisively in favor of any of the theories."[3]

It is known that one glacier, for example, moved so fast that it covered the living forest. It is believed that the dome of Mt. Lassen and similar ones may have risen in less than a decade. Since 1943 Mt. Paricutin has risen over 1,600 ft. in height. Since its last major earth tremor, certain ground areas of Alaska have risen some 50 feet. Such phenomena as these cannot be called "slow, gradual rise." Many mountain ranges had large, active volcanoes during the Ice Age. Among them are those of the Cascades, Caucuses and East African ranges.

In "The Dying of the Giants" I cited several authors as support of my belief that many mountains may have been lower in elevation at the close of the Ice Age. Gansser, whom I cited, writes, "We may well recall the interesting idea ventured by B. Sahni that the earliest migrations were facilitated by a barrier of less forbidding height and steepness than the impressive Himalayas of today."[4] Schneider, in his work on the Himalayas, has pointed out: "In the formation of the Himalayas we have to do with an intensity and tempo unknown to former geological times."[5] The close of the Ice Age saw men migrating all over the world. Evidently some believe that earlier Himalayan mountain passes were more conducive for travel than those of today.

One school of geographers holds that man was present when the great rifts of East Africa were being developed. Several Israeli geographers hold that the present Dead Sea is no older than 12,000 years. The Dead Sea is part of the same geological rift that includes the Red Sea and East African grabens. Carl Sauer writes: "East Africa, still a land of volcanoes, was much more so at the time when the human record begins."[6]

Some geologists hold to the view that Mt. Vesuvius (over 3800 ft.) has risen to its present height in the last 10,000 years. It is also believed that most of the tallest Labrador mountains were submerged some time during the Pleistocene. The same was probably the case with mountainous areas of Indonesia.

The reader should be aware at this point, that there is widespread disagreement over the length of the Pleistocene Ice Age. And also aware, that the shorter its duration the more vexing and inexplicable some of its events should be considered. C. Wroe Wolf has said: "Probably at no time in earth history have more changes been produced upon the face of the earth in as short a time as during the Pleistocene epoch."[7]

Dr. Wm. F. Albright has stated his conviction: "One thing is certain, it is increasingly difficult to place the beginning of the first Pleistocene glaciation at more than some 250,000 years ago." Further he notes of both the Age and its fossil man: "They may both be much more recent."[8] Boule and Vallois, while holding for a possible 500,000 year duration of the Quarternary, point out that a few geologists (French, Swedish, and American), adhere to a duration time of only 10,000; 30,000 and 100 - 150 thousand years respectively."[9]

The close of the Ice Age used to be held by some as having terminated 40-50,000 years ago. Now numerous authorities place it at 11,000 years,[10] 10,000 years,[11] and even 8,000 years.[12] Radiocarbon dating has virtually silenced the much older dating position, once so widely held. Some authorities feel that the recency of the close of the Ice Age calls for a much harder look at its time of beginning. Dating is much more untenable than many people realize.

Dr. Cuffey writes: "The late Pleistocene extinctions took place gradually over a period of many thousand years, and not all at the very end of Pleistocene

Cuffey

(*Continued from page 22*)

out a long period of late Cenozoic time, not as a sudden and concentrated wave at the end of the Pleistocene (as Springstead's quotations can be misinterpreted to imply). A number of organisms died out at various times within the Pliocene (Leopold, 1967, p. 204, 211; Martin, 1967, p. 82, 84). Others became extinct early in the Pleistocene (Martin, 1967, p. 82, 84, 85); moreover, "in the oldest Pleistocene (Villafranchian) a successive extinction of many evolutionary lines occurred. . ." (Kowalski, 1967, p. 351). Later in the Pleistocene, as the ice sheets waxed and waned, "particular species died out during different glaciations" (Kowalski, 1967, p. 352; also note Martin, 1967, p. 82, 85, 86). Some of the large terrestrial herbivores, and the carnivores and scavengers depending on them, became extinct only about 8,000 to 10,000 years ago at the end of the Pleistocene (Martin, 1967, p. 83, 84, 95); as Edwards points out (1967, p. 143), their conspicuousness results in the fact that "our present view of the late-Pleistocene extinction rate is therefore exaggerated. . . ." Finally, still other species have died out only in the last few centuries (Kowalski, 1967, p. 361-363; Martin, 1967, p. 102-105; Martin and Guilday, 1967, p. 5-6). Thus, in summary, extinctions took place gradually and over an extended period of many thousands of years during late Cenozoic times. Consequently, there is no paleontologic basis for believing that a major catastrophic event, such as a world-wide flood, is recorded in the rocks; Springstead's main thesis is simply not consistent with the available evidence.

As far as the actual causes of the Pleistocene extinctions are concerned, at least three can be recognized as having been critically important in particular situations. Sometimes, extinctions have been caused by change or disappearance of a habitat, due to climatic changes caused by glacial advance or retreat (Kowalski, 1967, p. 354, 356, 357). Other extinctions have resulted from destruction of habitats due to the agricultural activities of early man (Guilday, 1967, p. 122; Kowalski, 1967, p. 361). Still others have resulted from the direct influence of the hunting activities of early man (Martin, 1967, p. 75, 102-105, 115; Walker, 1967, p. 431-432).

Springstead's present rebuttal reflects some of the common and widespread misunderstandings of uniformitarianism as a working principle or attitude of the modern earth scientist. Van de Fliert (1969) gave

times." This seeming refusal to agree with numerous authorities is puzzling. Carl Hubbs writes: "Radiocarbon dates confirm the fact, evident to Darwin and Lyell, that extinction was mainly a post glacial event."[13] The Quarternarists, Wright and Frey were cited: "Why did the most conspicuous extinctions occur so late and after the last glaciation?"[14] The preface of "Pleistocene Extinctions: The Search for a Cause" points out: "The pattern of extinction at the end of the Pleistocene did happen 'overnight' in a relative sense—in New Zealand and perhaps in North America in less than 1,000 years—in roughly 1/300th of the estimated time for the longevity (duration) of a species of mammals."[15] Dr. Romer has pointed out: "No adequate explanation has ever been given for this mass extinction of large North American mammals." Concerning man he writes: "He certainly played little direct part in killing of these large beasts."[16]

Several necessary facts must be kept in mind. One is, that ordinarily fossil finds represent only an infinitely small number of the species that existed. Another is that it takes a catastrophe to create good fossils. And the third is that ordinarily, mammal fossils are due to extermination by either man or geological disturbances. When writers speak therefore of "mass extinction", only one of the two factors are involved. Let me cite two examples. The finding of some thousands of horse bones in France is thought to be by reason of human agency. The discovery of a thousand mammoth skeletons at Predmost is thought to be by either earth or glacial activity.

Carl Sauer notes: "The ancient hunters and the ancient game animals seem to have left the scene together."[17] Were hunters the main reason for the extinction? How many hunters were present in the Americas 10,000 years ago? N. J. Berrill points out: "All these extinctions coincided with the presence of man." Later he postulates: "Men may have been the victims as well as the beasts."[18] J. J. Hester notes: "Of the species that became extinct, Early Man hunted only two to any great degree—mammoth and bison."[19] Significantly mammoth molars are the chief mammal find in Florida. From a seeming inexhaustible supply, around 50,000 mammoth tusks have been found in Siberia over the last few centuries. The numbers of early man in Europe at this time were probably few.

Concerning the unusual size of many of the Pleistocene mammals, authority is not lacking. Sonia Cole writes: "Giants are particularly characteristic of the Pleistocene in Africa."[20] Romer states: "The Pleistocene giants include representatives of almost every order of mammals."[21] Kurten comments: "A number of the animals are now considerably smaller, on an average, than their ancestors at the end of the Pleistocene: Successive samples indicate that dwarfing has proceeded continually during the last 10,000 years or more."[22]

I cited authority for extensive marine transgression in Western Siberia during the Quarternary. An American team, Richards and Fairbridge write: "Occurrence of glacial-marine deposits in the Yenisei region of the West Siberian lowland is firmly established. Fossils and the character of the Quarternary rocks in which the fossils were found prove that these rocks were formed by the concentrated action of a transgressing and regressing sea, and by glacial deposition."[23] Encyclopedia Britannica notes that during the Ice Age: "The Caspian was once again linked with the Black Sea by way of the Manych depression of the Northern Caucuses."[24] Alimen cities evidence of a "marine gulf" penetrating up the Rhone "as far as the region of Lyon."[25] The areas involved would be extensive. West Siberia, for example, is a flat level plain some 90,000 miles in size.

Genesis 7:11 (Ferrar Fenton translation) reads: "On that day all the depths of the Great Ocean were heaved up." Such language not only provides a second major source of deluge water; but strongly infers up-

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an excellent extended discussion of uniformitarianism which is well-worth reading in connection with the present notes. Let me elaborate very briefly, however, on a few points raised by Springstead's rebuttal.

Uniformitarianism, as used by the modern practicing geologist, is simply the attitude that the kinds of processes and events which we see operating today were responsible, over long periods of time, for shaping the earth and the organisms living on it, unless convincing evidence to the contrary exists. As Beerbower (quoted by Springstead) says, uniformitarianism is indeed a working principle or attitude, rather than an invariable rule. Geologists agree that these kinds of processes and events can (and sometimes did) operate at different intensities than today's, as Springstead's quotation of Simpson's comment implies; however, difference in rates or scales certainly does not invalidate the practical use of uniformitarianism. In fact, although many seem not to realize this, even such a different event as a brief world-wide flood would leave unmistakable evidence from which uniformitarian principles would correctly interpret the actual historical event. (The reason modern geologists do not accept a recent world-wide deluge is that there is no such evidence for it, as well as much evidence inconsistent with its ever having occurred.) To return to Springstead's rebuttal, the examples cited—in which geological processes are shown to have operated with noticeable results within relatively short periods of geologic time—are all clearly well within the uniformitarian scope of action, in spite of his implication to the contrary. In particular, note that some geological processes —such as explosive volcanic eruptions, ground movements due to earthquakes, and large floods resulting from sudden breaking of natural (or artificial) dams or levees—produce dramatic effects on a local or regional scale. These are therefore sometimes *loosely* referred to as "catastrophic", but are nonetheless fully uniformitarian in character; quoting descriptions of such events certainly does not disprove uniformitarianism.

The events of the Pleistocene are closely related to the events of the late Cenozoic as a whole, and are quite well understood in terms of modern uniformitarian geologic thought (Flint, 1957; Dunbar and Waage, 1969, p. 431-446; Kay and Colbert, 1965, p. 557-603). In particular, many regions of the earth's crust covered by the large continental ice sheets were depressed by the load of the ice. The ice melted away (about 10,000 years ago) quite rapidly compared to the rate at which the earth's crust could rebound upward to its preglacial

heaval of the ocean bottom, in order to release the subterranean water sources. One is reminded of the conviction of the Christian archaelogist, Dr. M. F. Unger. Contending for a world deluge he wrote: "Nothing less than such a cataclysmic disaster can satisfy the scope of the Genesis passage." [26]

Genesis 8:4 implicitly records: "And the ark rested in the seventh month, on the seventeenth day of the month, upon the mountains of Ararat." Does this geographic mention refer to the two Ararats or to nearby lower mountains? Both Ararats rise from a base of about 8,800 feet. If the ark landed on mountains nearby, only half as high, it would need a flood depth of over four thousand feet. And a flood of that depth would cover more than three fourths of today's world.

In conclusion I would like to say this. Science, by its nature, is based on skepticism and demands evidence. Scripture, by its nature, must be accepted by faith and that based upon divine revelation. The reverent scientist needs to be aware of both, but they cannot be held in equal esteem. Scientific evidence is limited, accumulative and subject to constant re-evaluation. Scripture's revelation, while varying in degree as to interpretation, is static, and to strain its interpretation is to arrive at absurdity. I enjoyed writing "The Dying of the Giants". As an untrained layman I am only too aware of its shortcomings. If it creates enough discussion to provoke some trained scientists to further research, I will obviously be amply rewarded. I trust I am not lacking in humility when I re-echo the statement of the controversial Robert Ardrey: "Truth is peering in my window and I cannot ask him to go away."

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elevation. Consequently, sea waters came in and briefly submerged such areas (like coastal New England, Canada, and Siberia) until crustal rebound carried the land back above sea level (a process still underway in some regions). This submergence, however, is quite different from the kind of world-wide cataclysmic flood which Springstead suggests might have occurred (and for which geologic evidence does not exist). Also, the dating of the Pleistocene—while obviously capable of further refinement—is not nearly so controversial or uncertain as Springstead seems to have concluded (Flint, 1957, p. 272-301; Coon, 1962, p. 221-227, 309-318, 577-579).

Springstead is certainly correct in emphasizing our requirement to search for and accept the truth regardless of where it is to be found. Moreover, geological truth is indeed peering in through our window. However, it seems to me to be saying that all the evidence supports the ideas and conclusions of modern geology, rather than those of flood geology. I echo Springstead's call for further research, but urge those heeding this call to concentrate their efforts in directions which break new ground in this field, rather than in the direction of trying to revive defunct and erroneous ideas.

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"ADAM AND ANTHROPOLOGY"

(*See* Journal ASA, 22, 88 (1970))

Rolland D. McCune, Central Seminary, Minneapolis, Minnesota

I read with near amusement the article by Paul H. Seely in the September issue of the *Journal.* I say "near amusement" because the content of the article would be hopelessly ludicrous to a Bible-believing Christian had it not been written as sober truth and intended to be received as such. I must confess that it has been a long time since I have seen that much scientific and theological mish mash within the confines of one short article.

If Mr. Seely enjoys spinning his anthropological yarn that much, I would implore the *Journal* to spare its readers any implication that his views on man bear resemblance to those of the Bible. It is somewhat unpleasant to a student of Scripture to see the Word of God evaporate before his very eyes in the name of "standard" hermeneutics, whatever on earth that may mean. If Mr. Seely has ever had so much as one class period in Genesis, Old Testament, Theology or Hermeneutics he has utterly discredited his teacher—or it could be that someone simply failed to wake him when the bell sounded.

While the content of such an article may be palatable to an enlightened anthropologist who has at long last expunged his theological prejudices based on the Word of the living God, it is repulsive to a Bible scholar who believes that the first Adam of Genesis one through four was just as historical as the "last Adam" of the New Testament who is none other than our Lord and Saviour, Jesus Christ. Such abysmal ignorance of Bible truth and interpretation as presented in Mr. Seely's article does not commend the *Journal* to serious acceptance.

Paul H. Seely, Portland, Oregon

Mr. McCune, a graduate of Grace Theological Seminary, writes from the perspective of one who takes "flood geology" seriously . . . as a satisfactory explanation of all pre-historic, scientific data. He, no doubt, finds any consideration of genuine science unworthy of "serious acceptance". Consequently, the readers of the *Journal,* who do *not* take the sciences *cum grano salis* as does McCune, will probably not take McCune's letter too seriously.

However, Mr. McCune's letter should serve as a powerful reminder (even to those of us who do not want to remember) that "flood geology" is an extremely popular and widespread delusion . . . and that, as Dr. Roger Cuffey said,

> I believe that it is very important to put the views of such men as van de Fliert before the Christian public, so that they are not so likely to be mislead by the erroneous view of people (like the flood geologists) ignorant of modern earth sciences. (*Journal ASA* 21, 71 (1969))

When I think of the years I spent fighting the sciences and defending the faith via Whitcomb and Morris *et al* . . . til snatched like a brand from the burning by reading the writings of genuinely competent Christian scientists in the *Journal,* I am again impressed to call for more effort on the part of the members of the ASA to make the sciences as they really exist more widely known.

The Whitcomb and Morris delusion, mythology, or whatever one wishes to call such a well-meant, but ill-devised pseudo-science has captured literally hundreds of Christian high schools, Bible schools, and seminaries . . . and through the graduates of these schools, the minds of thousands of Christians. It spreads like a giant cancer . . . unfelt by the Church for a time, but in the end . . . making its obscurantism result in disillusionment, debacle, and spiritual death.

The ASA and its work are largely unknown to the evangelical world . . . especially to the carefully sequestered students and laymen. In times like these, this is a shame. I think it is imperative that every ASA member think long and hard as to how they can help in displacing pseudo-science from the evangelical world.

I would conclude with just one small proposal: that the article "Fundamentalism and the Fundamentals of Geology" (*Journal ASA* 21, 69 (1969)) along with the recent Symposium on The Relation Between the Bible and Science (*Journal ASA* 21, 97-124 (1969)) be reprinted as a separate booklet (or pamphlets) . . . for distribution to students and laymen. Or, at the very least, that permission be granted for reprinting these articles to anyone desirous of doing so.

The fundamental question seems to be, not whether organic evolution is a creative process, but whether the idea of a natural creative process makes sense without the inclusion in the process of a creative ground capable of envisaging the possibilities inherent in it. . . . We can say that natural processes have produced a development that looks like progress from our human point of view. . . . But the fact itself, if it is a fact, must remain unintelligible, a mystery and a miracle. We can assert that blind force has produced conscious intellect and will, but we can never understand how that could happen.

John C. Greene in *Darwin and the Modern World View,* New American Library, 1963, pp. 74, 75.

"THE RELATIONSHIP BETWEEN THE BIBLE AND SCIENCE"

(*See* Journal ASA, 21, 97-124 (1969))

Bruce Erkilla, Los Alamos Scientific Laboratory, Los Alamos, California

It is not my purpose to argue, debate or try to change the convictions of Mr. J. D. Albert, but I would like to point out a completely opposite point of view.

To me the Bible is the *foundation* to *all* physical and spiritual knowledge including "science". The Bible does much more than to answer the question why. It answers such questions as *what* is man, *where* did man come from, and *when* did man arrive here on earth. It also provides the answer to *why* was man born and *where* is man going. The Bible is the true foundation if we know how to use it.

Scientists do not like to include the study of the spiritual world with the study of the physical world. They like to keep the two separate because it is more comfortable that way. True knowledge and True science must include both the spiritual and the physical worlds to have total understanding.

As a physicist I probe nature to understand more about physical laws which regulate the motion and structure of all matter. Until I understand these laws I know I will not be able to begin to understand this world I live in. At the same time I do not hope to have a complete understanding of this physical world and the laws which regulate it without having understanding of the spiritual world and its laws. I am limited in my understanding of the physical world until I receive knowledge about the spiritual world too. The human mind will never really understand what life is or what such things as gravity is until our creator and lawgiver gives us the necessary understanding of the spirit.

To me the Bible does not just contain truth about spiritual matters. It is obvious to me that the Bible contains truth about many physical processes and historical events. The geologist who is ignorant of the Bible cannot possibly understand what he observes in the rocks of the earth. The Bible is the only source which I am aware of that reveals the truth about the great floods in the past. Without that knowledge scientists misinterpret scientific evidence.

Here is a simple example. I as a physicist seek to better understand the nature of nuclear forces and the structure of nuclear matter. Most people would ask how can this study be related to the Bible? From the Bible I learn that a great designer, creator mind is behind all the patterns and designs I observe in this physical world. I learn that this great mind was responsible for putting laws into action which regulate this physical world, and then He created the physical world in harmony with those laws. I learn from the Bible that there is order to all of these inventions, so I am not at all surprised when I find order in every thing in the physical world around me. I now expect to find order and perfect design in everything I study from now on. In fact I look for it. When I seek to better understand the nature of nuclear forces and the structure of nuclear matter I am not surprised to find a design and a perfect pattern. The closer man looks at this physical world the more great design he finds in it. This fact points directly at a great designer mind behind the world. It just could not have happened that way. At the same time I do not become frustrated when all my questions are not answered by men's knowledge because I know that we still lack the required spiritual knowledge to perfectly understand even this physical world. The Scientist who does not know God and the Bible misses a great deal even in his understanding of this physical world.

Is a study of human nature science? The Bible has much to say about human nature. In fact without the Bible man would not know much truth about the nature of man. Who knows more about man than the One who made man? The Bible provides the foundation to understanding the nature of man in my opinion.

The Bible contains truth and information about government, geology, meteorology, astronomy, biology, sociology, history, psychology, agriculture, economics, health, business, and education to name a few. Important principles in each of these areas are contained in the Bible or I do not understand the Bible. I am certain that men would have to change many of their ideas of knowledge and understanding if they would take the Bible as their foundation and build understanding from there.

I am enclosing an article that may give you an idea of what *might happen* if "scientists" would first take the Bible and build knowledge and understanding of evidence from there. When I study the Bible and articles such as this one I begin to wonder just how much misunderstanding and mis-education I have and the great "scientists" of this world have. The possibilities are interesting to say the least.

(*The enclosed article is "Dinosaurs* Before *Adam?" by Robert E. Gentet, Contributing Editor of* The Plain Truth, *Herbert W. Armstrong, Editor. It espouses the "Gap Theory" between Genesis* 1:1 *and* 1:2.)

David L. Dye, Kirtland AFB, New Mexico

My own views on the relation between the Bible and science have been published elsewhere in a larger exposition.[1] I was pleasantly surprised to note that most of the contributors to the Symposium expressed or implied quite similar views, and that there is apparently emerging among evangelical scientists a recognition of the need for reinterpretation of data to arrive at a consistent position on the issues that have unnecessarily divided Christians and scientists. This fact was commented on also by David Moberg in the same issue.

The correspondence between many of the statements in the Symposium essays and statements in reference 1 were so striking that I have made a partial correlation. In the following, first the Symposium is

quoted, in italics; then reference 1 is quoted, with a page number.

(1) Jerry Albert: *"The Bible tends to answer questions beginning with "why" . . . Science tends to answer questions . . . "how" . . . The Bible is concerned with ultimate purpose; science is concerned with mechanisms."* Science tells us how things happen, not why. (p. 52) (See also below (11A) on the philosophical neutrality of science.)

(2) Marie Berg: *"I refuse to look upon the scriptures as a scientific textbook. . ."* Remember that God's purposes in revelation are not to give man a complete scientific treatise on cosmology, zoology, or history. . . (p. 123) (See also the quote from p. 134 in (17) below.)

(3) Dick Bube: *". . . The Christian must not react in fear to the fossil record. The reliability of the Bible and the vitality of a life with Jesus Christ do not depend . . . on the proof or disproof of even the general theory of evolution."* . . . The facts of science, which are so readily interpretable on the basis of evolution, are as philosophically neutral as any other scientific data. Evolution, even applied to *homo sapiens,* is not a philosophical principle, but a means of biological description. . . . Evolution is not ammunition for one view against another, nor the exclusive property of the irreligious. The consistent Christian *needs* some such hypothesis to assist him in accounting for the vast amount of physical data he has which is not explicitly discussed in the Biblical record. . . In addition the Christian has the spiritual data to show him he is a created spiritual being with moral responsibility to God. . . (p. 150)

(4) Wilbur Bullock: *"We must honestly admit that our knowledge of spiritual . . . and scientific truth is really infinitesimally small. . . The apparent conflicts . . . become exciting and challenging areas of study. . ."* Tentativeness is another important principle of interpretation, since we may yet have acquired neither the broad view of scripture nor the complete detailed scientific understanding needed to harmonize the data . . . (p. 123) Advice to the reader: Keep reading! . . . We orthodox Christians have everything to gain by aggressively pursuing truths from all sources . . . (p. 176-7)

(5) Stephen Calhoon: *". . . If it looks as though evidence at hand warrants a conclusion contradictory to scripture, he can be sure that further evidence is needed. . ."* They (revealed data) neither support nor preclude any of the current scientific (i.e., descriptive) hypotheses on the origin of the universe. Gamow, Hoyle, Alfven, or Opik, or none of them, may be correct in his scientific views . . .; the correct interpretation of observed data will be found eventually to be consistent with the simple statements of Genesis. (p. 135)

(6) Gary Collins; two examples among many agreements: *A. ". . . two basic assumptions (in science) . . . first that the world contains facts and events which can be observed. Second . . . observables are related to logical and consistent ways. . ."* Science, that is, the scientific method, describes the physical universe by means of (a) data observation, (b) generalizations into explanations that account for data, and (c) further experimental verifications of the consistency of the descriptions. The practice of science depends on the three corresponding presuppositions: (a) that there is such a thing as observable reality, (b) that this reality is such that its description is logical or self-consistent, and (c) that this reality is casual. (p. 178)

B. "Emotional involvement with our pet ideas, and selective perception as we look to the data, probably contribute much to the heated conflict that surrounds issues such as evolution." The world view's task, to provide a framework of meaning on which we may hang the data we constantly receive, involves all facets of our personalities. . . It is natural and easy to have emotional involvement. . . So people, including scientists and Christians, approach their respective data with philosophical pre-conceptions. . . The world view may even influence the way data is taken, as we subconsciously try to bolster our positions. . . Such an argument is circular. . . (p. 71-2)

(7) Roger Cuffey: one example among several resonant ideas: *"Exegesis is further limited as a scientific tool because ancient writings can be interpreted only in terms of the languages and concepts . . . available to their authors. . ."* The Christian view recognizes prescientific language and ancient cultural contexts as such, and symbolism of literary language. For example we do not hold dogmatically that heaven is a physical place, up in the sky somewhere. . . Perhaps the ancient writers did, but the revelation of God to modern man is not assisted by this concept, and the language of scripture bearing on this point is interpretable of a reality too wonderful to be contained in the notions of mere four-dimensional space-time. The Christian interpretation . . . accepts (by faith) the reality being symbolized. . . (p. 127)

(8) Harold Hartzler: *"The main purpose of the Bible is to show that God is a loving heavenly Father and that Jesus Christ came . . . to seek and save the lost. Science . . . is interested in formulating as complete a description as possible of the universe."* To understand the Bible as history, we must seek the Bible's own statements . . . concerning the purposes for which it was written . . . God reveals Himself through Jesus Christ . . . the data given throughout all the Bible subserve that personal revelation. (p. 108) As scientists we believe that more data will serve to narrow the possible range of interpretations of existing data, and thus ultimately lead to correct descriptions of physical reality. (p. 25)

(9) George Horner: *". . . a literalist interpretation of (Gen. 1-3) forces one to focus on man's physical origin rather than on man's relationship to God, the origin of man's spiritual nature . . . in God's image . . . It is the implanting of God's image in man which is the point of these chapters."* This was a new departure, an act of creation; not the creation of a new physical body, but of a personality . . . (p. 148) The "image of God" is certainly non-physical, for "God is a spirit. . ." It is this spiritual side of man that characterizes him, in the Christian view, and the bodily form is quite incidental. (p. 149)

(10) Russell Heddendorf: *". . . The particular concern is with a general theory of society. The Biblical description of society is based on the fact of man's alienation from God and resultant sinfulness. . ."* An area of application . . . to which the Christian view is especially relevant, is social action. The Biblical . . . view . . . implies approaches to all social problems. . . These problems normally have common roots in ego-

centric human nature. . . It is our total world view that is to be applied to these cultural problems. . . . (p. 176)

(11) Irving Knobloch; two examples:
A. "No scientist . . . in his daily work as a scientist ever deals with matters of morals, with the soul, or with the after life. . . They are conducting themselves properly by keeping these areas separated." Our assumption regarding an external physical reality is equivalent to the assertion that . . . science deals exclusively in the realm of the physically observable . . . . . . science may be articulate if tentative, in its description of (the) observable . . . but it must be mute on other questions. (p. 49) If science is to be the objective discipline most scientists consider it to be, it must be limited to descriptions of an objective observable reality. Questions concerning a scientific basis for ethics, the moral un-neutrality of science, or support for any world view, are valid only when understood as philosophical rather than scientific questions. (p. 35)
B. "We must stay flexible in all non-essentials. Inflexibility in the past has led to ludicrous consequences." The church's reaction to Roger Bacon, Galileo Galilei, and Charles Darwin exemplify both the inadequacy and the disastrous consequences of a traditionalist world view that fails to allow for scientific data. (p. 14) A more flexible view of science within conservative evangelical churches will prepare believers not only for their encounters with alien views, but for a richer experience within their own views. (p. 15)

(12) T. H. Leith; among many new and beautifully deep insights, one example: *"The ultimate test for any scientific theory is how well it fits what we know from experience in the physical world. . ."* The process of scientific verification involves acquisition of data that relate in a predictable or implicit way to some generalization (theory). . . Either it fits or it does not; or, more likely it partly fits the predictions. . . When data begins to fit into consistent descriptive explanations, we are tempted to conclude that we are on the verge of proof of a theory. . . (p. 26)

(13) Gordon Lewthwaite; one example among several: *". . . inspiration did not necessarily breach or exclude some occasional elements of the prescientific thought forms of ancient culture. . ."* God has worked in and through various men throughout history in more or less overt ways, and both with and without their knowledge of his working, to record the words and concepts He wanted to use to reveal Himself to us. . . God guided in the choice of words, normally using the vocabulary and mentality of a local prescientific cultural context to express or exemplify concepts with universal meanings which could later be seen to have validity for other cultures. (p. 121-2)

(14) George Mavrodes: *". . . The Bible contains the true answers to some scientific questions and not to others"* (No implication that answers are untrue, merely that they aren't there!) Science, of course, cannot say why these events occurred. . . The Bible gives only a sketchy description of how they occurred, but does state that God caused these events to happen. The laws of chemistry and statistics are God's laws, so the processes are at once natural and supernatural. Science speculates that it could have happened as we have briefly outlined, and the Biblical data are remarkably consistent with what physical facts there are. (p. 141)

(16) John A. McIntyre; one example among the many in which fellow nuclear physicists agree: *". . . cannot the scientist recommend to the theologian the use of some of the techniques and attitudes . . . fruitful in the study of the natural world? . . . If our interpretations of scripture are to develop in a healthy way as new scientific evidence accumulates, we must capture theologically the free thinking as well as the conservative features of the scientific enterprise. . ."* Observed data in physical reality (is to be) interpreted jointly with the objective statements of scripture. In addition to objective scientific data (there are) subjective data (which) are observable, though they may originate in or result from an interaction between the Spirit of God and the physical person . . . (p. 75) (There is) a need of all people to (1) be tentative in forming conclusions, (2) distinguish raw from processed (interpreted) data, and (3) recognize presuppositions and the influence of one's world view on his data interpretations. (p. 74) . . . With a healthy world view that honestly, yet critically, accepts all data, the Christian possesses criteria by which to relate his faith. . . (p. 14)

(17) Russell Mixter; one of several examples: *". . . The Bible is to be commended for what it does not say as well as for what it does reveal. . ."* We need not read any preconceived cosmological model into these revealed statements (Gen 1:1-2); none is there intrinsically. . . God's purpose in revealing this datum is to let us know that He is the Creator of the universe. Apparently He didn't want to force the prescientific Hebrews to wade through some technical pargon on the astrophysical processes involved, since they might have stopped reading before they got to the really important parts of His revelation of Himself. (p. 134)

(18) Jim Neidhardt; two of many examples of agreement: *A. "It is not the Bible's purpose to reveal the details of physico-chemical mechanisms."* (See the quote from page 134, ref 1, in (17) above.)
B. "Biblical descriptions of nature are phenomenological. . . Such language . . . frees the reader to respond to the primary purpose of scripture . . . Biblical revelation and scientific explanation are thus seen to be different yet equally valid perspectives of the same God-given reality; the two . . . are complementary. . ." The implication of our five presuppositions is that general and special revelation are mutually consistent. In short, "all truth is God's truth." The facts of nature and the statements of scripture must together constitute a harmonious total structure of truth. That is, raw data to be interpreted jointly. . . (p. 69)) (See also the quote from p. 141 in (14) above, about the laws of nature being God's laws.)

(19) John W. Montgomery: *". . .extra-Biblical data can never determine the meaning of the scriptural text (though of course such data can and must pose questions for the Bible interpreter. . .)"* In this case (Sennecharib's seige of Jerusalem) the two records can be correlated—the Assyrians' silence is significant, and an additional data source (Herodotus) is available. In other cases, present evidence from extra-Biblical sources is too meager to make a good correlation. In a very few cases, there is outright conflict between sources, but it is significant that new archaelogical discovery has always tended to confirm the accuracy of the Bible. (p. 107) (See also quotes in (5) above.)

(20) James A. Oakland: *"Psychology is an extremely broad and heterogeneous field. . . With which 'psychology' are we to discuss the relationship (with the Bible)? Similarly, the multiplicity . . . of Biblical interpretations . . . raises the same problem. . . Given this mutual state of affairs, the best response is a generous portion of humility, not dogmatism, on both sides."* . . . Tentativeness of all scientific conclusions, which is a truly scientific attitude is analogous to humility. (p. 72) (See also quotes from p. 74 in (16) and from pp 14-15 in (11B) above.)

(21) C. E. Walker: *". . . science is impartial regarding values and goals. . . Values pertain to men, not to science. . . The bulk of the revelational truth found in the Bible deals with values, goals and unobservables. . ."* Science, as we have seen, is amoral; i.e., neutral on the ethical quality of personal actions. (p. 100) The scientific method can provide us with the means of rational consistency, if not the goals and meanings of our existence. . . This is the proper function of science. (p. 52) ". . . Man's needs are more basic than the types of problems science can solve. We need ethical guidance for life which the increasingly accurate scientific descriptions do not contain. Indeed we need more than standards . . . at a deeper level we need the goals in life that can provide the desire and ability to live according to those standards . . . To borrow a mathematical phrase, science is philosophically indeterminate. One's goals and purposes in life, which are intertwined with one's world view, are therefore also not uniquely determinable by scientific means. (p. 12) When a finite human personality comes into the vital relationship with the infinite spiritual Person of God, that human soul is no longer left to drift whimsically among cross-currents of its own egocentricity. Love for the Heavenly Father becomes a driving force and purpose. . . . Not only ethical standards are thus provided, but also the desire to meet the standards rather than to rebel against them in selfwill. The ego is still present, but egocentricity, that is sin, is no longer the dominant trait of a person related to God. (p. 96)

(22) Robert L. Wilson: *". . . The scriptures . . . are written in the language and a culture far removed from the scientific era. . . For this reason . . . it is a gross injustice to the scriptures and also to science to make use of them in a manner . . . which was never intended."* (See quotes regarding purposes of revelation and prescientific language and culture in (2), (7), (8), (13), (17), and (18) above.) (The philosophical neutrality of science) potentially allows science to proceed unfettered by personal philosophic bias. Parallel to this feature . . . the human mind is free to pursue religious truth with the conviction that scientific description can complement them. . . . Our quest for personal meaning proceeds unfettered by the limitations of science, rather using science as a means of consistency. . . (p. 52)

Of course, we all owe a lot to Bernard Ramm's 1954 book[2], on which most of us teethed way back then, or at least chewed over. Some of the agreement noted here between Symposium writers must stem from this. His clearly reasoned lead-in article on Biblical inerrancy sets the stage nicely for the rest of the Symposium. He sees the need for tentativity in interpretation of the raw data of scripture, recognizing the purposes and prescientific cultural contexts of the revelation of God to man; just as several others did in the Symposium. And, he shows the logical inadequacy of insisting on (idolizing?) inerrancy for its own sake, a point well worth emphasizing. I would particularly second Ramm's assertion on page 100 of the *Journal*, that Christians do not stick to their faith because of inerrancy of the scriptures but "because of their experience with Christ . . . and of the Spiritual content of Holy Scripture which has no effectively spoken to their own hearts." This experience also gives us the confidence that bits of Biblical data we cannot now reconcile with currently known physical data are actually consistent, if they could be interpreted in the eternal context.

Another factor in this developing agreement between us evangelical scientists is the recent publication and wide acceptance of Dick Bube's book[3], which also clearly and succinctly states a position underlying many of the Symposium statements.

The encouraging thing about the *Journal ASA* Symposium was that among nearly all the contributors there was a general consensus. This fact, that so many of the evangelical Christian (Bible-believing) scholarly community represented in ASA agree on these basic issues, bodes well for the communication of the gospel to our professional colleagues. I trust that we can continue the interchanges and developments of views with increased love for one another.

REFERENCES

[1]David L. Dye, *"Faith and the Physical World: A Comprehensive View,"* William B. Eerdmans Publishing Company, 1966, paperback.

[2]Bernard Ramm, *"The Christian View of Science and Scripture,"* William B. Eerdmans Publishing Company, 1954.

[3]R. H. Bube, Editor, *"The Encounter Between Christianity and Science,"* William B. Eerdmans Publishing Company, 1968.

Paul H. Seely, Portland, Oregon

In "The Relation Between the Bible and Science" I noticed that H. Harold Hartzler and J. Warwick Montgomery both subscribe to the same basic logic: Possibly errant descriptions of nature must be subjected to and corrected by inerrant descriptions of nature. This is sound logic. Is it feasible? Is it Biblical?

Hartzler and Montgomery believe that descriptions of nature from Science (a) originate with men who do not know the absolute truth, and (b) are given in conceptual forms which may be mistaken—possibly errant descriptions. They seem to lose sight here that men are working in science under common grace; but, essentially these propositions are sound. They believe, on the other hand, that descriptions of nature from the Bible (a) originate with God who knows the absolute truth, and (b) are given in veracious propositional form—inerrant descriptions. We can only agree with part (a) and will show why below.

If *all* the propositions of Hartzler and Montgomery were true, one could easily subscribe to their logical formula: Examine what the Bible says on a subject, accept it as true; and then place all human scientific propositions on a secondary level to be interpreted and corrected by the Biblical statements. But, unfortunately their idea that all Biblical descriptions of nature are

veracious is unbiblical and on occasion must appear false even to themselves.

The Correspondence Theory of Truth is Not the Predominant Biblical Theory of Truth

The Bible nowhere teaches that its descriptions of nature are in exact correspondence with God's omniscience. This idea is a purely human assumption (and therefore "possibly errant"). The Bible nowhere teaches that God will only speak in exact correspondence with what He knows to be true—correspondence theory of truth.

This idea that God can only speak in absolute correspondence with His omniscience arises from approaching God scholastically, abstractly, and academically instead of as Father. It arises from reading into Biblical statements about truth (and lies) an unbiblical philsophical definition of Truth. It arises from treating figurative statements on the authority of Scripture as literal scientific statements.

Truth in Scripture is preeminently personal-moral-existential and only secondarily a matter of correspondence theory. God is a Father, not a Philosopher. Pilate with his unbiblical view of Truth (John 18:38) could not understand Christ's personal-moral-existential view of Truth (John 18:37). Biblical "Truth" is not essentially a proposition that one *knows*, but the will of a Father that one *does* (John 3:21; I John 1:6). In the Bible a knowledge of the Truth is grounded in the existential world, it is not an abstract proposition (John 7:17).

Not that the Bible is unaware of the correspondence theory of Truth, but accomplishing God's will is a prior consideration. Deception is of God if it accomplishes His will. Rahab's lie, the *sine qua non* of her saving God's spies is done in obedience to the Truth—and she is justified (Hebrews 11:31). The deceptive ambush at Ai is God's plan (Joshua 8:1-23). The deception that Samuel practiced on the elders of Bethlehem (he had not come "peaceably" as he said) is of God directly and overtly that David might be anointed King (I Samuel 16:1-5). In the Bible, correspondence to God's will (personal-moral-existential truth) is more important than correspondence to "reality" (abstract truth)—and the former Truth may negate the latter.

"Inerrant Biblical Propositions" Are an Abstraction

Even *if* the Bible gave inerrant descriptions of nature, these descriptions would not be inerrant for men. Even a perspicacious Bible that is self-interpreting leaves us with less than apodictic certainty. Peter could not always understand Paul (II Peter 3:16); and Paul "saw in a mirror darkly" (I Cor. 13:12). Even when Jeremiah received the Word of God directly (Jeremiah 32:6, 7), he did not have absolute certainty about that Word til he saw it come to pass with his own ("possibly errant") eyes (Jeremiah 32:8).

Even *if* the Word of God contained only inerrant propositions, those propositions would have no meaning for men—til they were interpreted. When a Christian says, "The Bible says. . .", he means, "I interpret the Bible to be saying. . . ." Every Biblical proposition comes to men only after having passed through a "historical-grammatical-critical" hermeneutic; and this "historical-grammatical-critical" grid is rooted and grounded on every side in the "possibly errant" observations of fallible men. Every would-be inerrant Biblical proposition having passed through this "possibly errant" grid partakes (as it enters men's minds) of "possible errancy."

So, the would-be inerrant Biblical propositions by which Hartzler and Montgomery would interpret and correct the "possibly errant" propositions of Science are themselves "possible errant"—for all practical purposes. They are only inerrant in an abstract, unreachable world. They cannot be used by men without becoming "possibly errant." Even when we rise by faith to "*know* in whom (note the personal relationship) we have believed," we do not become infallible. Faith is not sight!

Biblical Propositions Are Conditioned by the Minds of the Immediate Recipients of the Revelation.

Not only are the Biblical propositions conditioned and made to partake of "possible errancy" by the act of interpreting the Scriptures; the Biblical propositions are sometimes conditioned and made to partake of errancy by the minds of the immediate recipients of the revelation—at the time of the giving of the revelation.

The idea that all Biblical propositions are unconditioned (so far as truth—correspondence theory—is concerned) by the minds of the recipients of revelation is an autonomuous Fundamentalist idea invented to defend Scripture, but foisted upon Scripture.

The Bible plainly shows us that truth (correspondence theory) is sometimes lost because of the minds of the recipients of revelation. Thus the Word of God was conditioned by the hardness of people's hearts—so that divorce, which so far as absolute truth (correspondence theory) is concerned is immoral, is allowed by God (Matthew 19:7, 8). And if a Biblical proposition can allow for immorality, how much more can it allow for deviation from a mere correspondence with "reality" on an amoral, scientific point?

From Deuteronomy 24:1-4 we can properly derive the truth that God allows divorce, but that truth is *not* in absolute accord with God's mind. Hence, we learn from Matthew 19:7, 8 that not all Biblical propositions (or more properly, legitimately derived truths from Biblical propositions) are in absolute accord with God's mind.

The Mustard Seed: A Concrete Example

The parable of the mustard seed (Matthew 13:31, 32) makes it concretely clear that the Hartzler-Montgomery formula is false.

According to Matthew 13:31, 32, the mustard seed is the "smallest of all seeds." This is a description of nature given to us by God who knows the absolute truth—it is supposedly inerrant. According to the Hartzler-Montgomery formula this "veracious Biblical proposition" cannot be overturned by any findings or propositions of Science. Indeed, according to Montgomery "extra-Biblical data can never determine the meaning of the Scriptural text."

However, even though the Bible is supposedly inerrant whenever it touches upon science (to quote the popular dictum of Fundamentalism), 99.44% of the interpreters of Matthew 13:31, 32 believe that the findings of science are valid—the mustard seed is *not* the smallest of all seeds. These exegetes categorically deny that this proposition of Jesus Christ is veracious—at

least, it is not veracious as a description of nature. Furthermore, they do not believe that the mustard plant becomes a "tree", nor that birds "dwell" in it. And they note that *normally* the mustard plant does not become very large.

As a description of nature by which scientific descriptions may be interpreted and corrected, these Biblical propositions are complete losers. Taken literally (as Hartzler and Montgomery *must* take these propositions since they cannot appeal to science), these propositions are scientifically incorrect at every point.

However, most Biblical expositors are not stopped for one minute by all of these scientific "lies". If as touching upon biological science, these Biblical propositions are dead wrong, they are still the bearers of valuable spiritual truth.

And if one considers that the *purpose* of the propositions was to teach spiritual and not scientific truth (even indirectly), the propositions are easily exempted from the charge of being lies. Having set out to communicate spiritual truths, Jesus Christ is not a liar because he employs propositions which are scientifically errant. Nor is there any real difficulty in the passage. For Jesus is simply employing popular thought (scientifically errant), popular proverbs (scientifically errant), and a variety of literary devices (scientifically errant) to convey spiritual truth.

We doubt that anyone will use the Hartzler-Montgomery formula on the mustard seed parable. No one will subject (and correct) the "possible errant" description of Science ("other seeds are smaller") to the "veracious Biblical proposition" ("the mustard seed is the smallest of all seeds"). No one will even back into the hopefully respectable corner of "Let the matter wait. Someday scientists will find that the mustard seed is the smallest seed."

No one will use the Hartzler-Montgomery formula because they know beyond a shadow of a doubt (having seen with their "possibly errant" eyes) that the mustard seed very simply is *not* "the smallest of all seeds." Rather, they will both contradict the Biblical description of the mustard seed and interpret the parable in the light of their extra-Biblical knowledge. In order to save the unbiblical theory of Biblical inerrancy, some will perhaps even deny that Matthew 13:31, 32 ever touches on matters of science at all.

In any case, the Hartzler-Montgomery formula is dead. It is not Biblical. It is based on an unbiblical definition of truth, or at best a half-truth definition of truth. It is an abstraction that cannot touch the world of men. It is in conflict with the Bible's teaching that some Biblical propositions do not reflect God's absolute mind on a matter. And it falls to the ground, stunned in the forehead by a mustard seed.

THE EVER-CONTEMPORARY SHAKESPEARE

And indeed it goes so heavily with my disposition that this goodly frame, the earth, seems to me a sterile promontory; this most excellent canopy, the air, look you, this brave o'erhanging firmament, this majestical roof fretted with golden fire, why, it appears no other thing to me than a foul and pestilent congregation of vapors. What a piece of work is man! how noble in reason! how infinite in faculty! in form and moving how express and admirable! in action how like an angel! in apprehension how like a god! the beauty of the world! the paragon of animals! And yet, to me, what is this quintessence of dust?

William Shakespeare *Hamlet*, Act II, Scene 2

More on Harold Hill and Joshua's Long Day

(*See Journal ASA* 22, 120 (1970))

I received the same vague reply in duplicated form as you did; however, I wrote back pressing him for more details and received no answer. . . His claim has been labeled as a hoax by *Eternity* (Oct. 1970, p. 43) and by *Christianity Today* (Sept. 11, 1970, p. 33). Rev. Dr. W. Shropshire of Arlington, Va. seems to have researched this question thoroughly and reports essentially the same thing as the above two magazines.

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Enclosed is a copy of a letter to the Huntsville News (Alabama) resulting from an investigation of the story. Computers could not find a missing day.

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Mr. Hill's article referred to in the *Journal ASA* has attracted considerable interest in Canada, having been reprinted by a columnist in one of the leading Toronto newspapers. The follow-up article a week later (*denying Mr. Hill's claim*) caused some Christians much disquiet.

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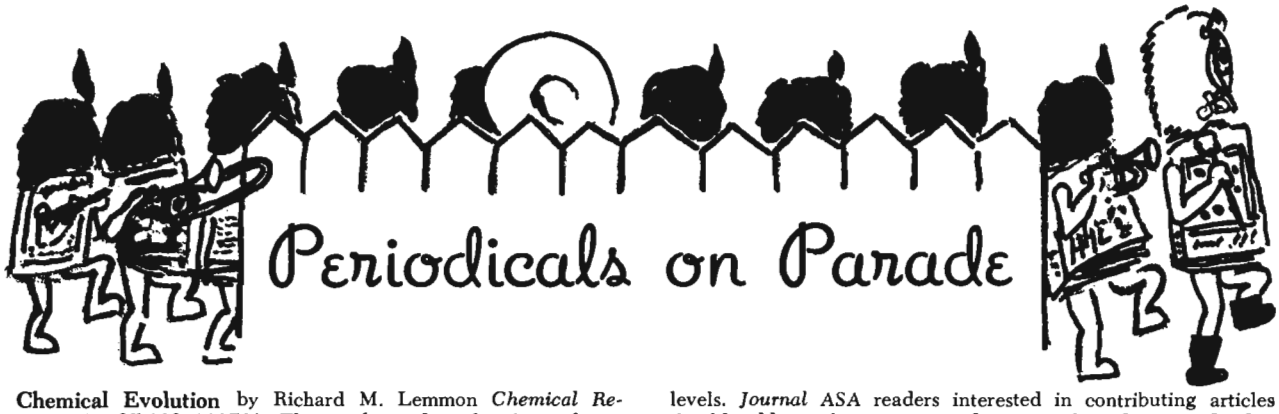
WE GOOFED!

The article, "An Evangelical Position on Birth Control," by Earl J. Reeves, Journal ASA 22, 51 (1970), *was incorrectly reported to be reprinted from* Birth Control and the Christian. *The article actually was reprinted from* Protest and Politics: Christianity and Contemporary Affairs, *edited by Robert G. Clouse, Robert D. Linder and Richard V. Pierard, Greenwood, South Carolina: The Attic Press, Inc.,* 1968.

In her Communication to the Journal ASA 22, 119 (1970), *we had printed Virginia Johnson as saying of Intervarsity, Campus Crusade and other Christian organizations on campus that they were too "Christ-oriented." In picking up the typo, Miss Johnson reminds us that no Christian organization can be too Christ-oriented. Her statement should have been that these organizations were too "Christian-oriented," i.e., unable to handle the intellectual challenge of non-Christian students in a strictly Christian context.*



Chemical Evolution by Richard M. Lemmon *Chemical Reviews* 70, 95-109 (1970). The results and implications of two decades of research into chemical evolution are reviewed. The probable conditions existing on the primitive earth are discussed and then the experimental conditions which have been used to simulate the primitive earth are described. The abiogenic synthesis of the biomonomers—constituent units of the biopolymers, proteins, nucleic acids etc.—is then discussed under the headings of amino acids, nucleic acid bases, nucleosides, nucleotides, fats and porphyrins. The basic chemical mixture for these experiments is composed of methane, ammonia and water, subjected to heat and high energy radiation. Nineteen of the 20 basic amino acids have been identified in such synthesis, generally in small yields, together with four out of five of the nucleic acid bases, and two of the three important sugars. The review goes on to discuss the abiogenic synthesis of proteins and the nucleic acids. The coupling of amino acids to form peptides has a positive free energy change! Under certain experimental conditions peptide-like compounds were formed from a mixture of amino acids. The theories of how the primitive chemicals form living cells is not discussed, but it states they "are both based on the notion that the emergence of life is the inevitable outcome of associational and organisational forces inherent in the macromolecules' chemistry." Reported by *Peter E. Childs* (Makerere University, Kampala, Uganda).

Chemical Origins of Cells by Sidney W. Fox, Kaoru Harada, Gottfried Krampitz, George Mueller—*Chemical and Engineering News* 48 (26) 80, (1970) provides in popular format a survey of current research concerning macromolecular and cellular origins and the chemistry of transition between inanimate and animate models. "At the level of macromolecule and protocell, research has, for the first time, provided in experimentally repeatable detail answers, in principle, to the following questions: (1) How did enzymes come into existence without enzymes to make them? Appropriate mixtures of diverse amino acids and appropriate geophysical conditions were needed. (2) How did cells come into existence without cells to make them? On suitable simple treatment with water, self-ordered polyamino acids assembled spontaneously into protocells. (3) How did membranes arise? The necessary selective and other properties were intrinsic to the self-assembled microsystems. Proteinoid itself has been shown to have some properties of lipids. (4) How did replication begin? One mode could have been, at the systems level, proliferation through "budding" of proteinoid microspheres, and physical growth of the "buds." With further evolutionary development, this could have resembled self-reproduction more closely; the contact might have yielded a basis for transmission of information to offspring. (5) How did "information" arise in macromolecules without the complex contemporary code? The first information could have arisen in polymers formed by the condensation of mixtures of diverse amino acids. The order indicated by experiments modeling such events makes unnecessary the concept of prior nucleic acid for the enzymelike and cell-like behavior described. Information in biopolymers thus originated from the monomers, and those internal limitations in the individual came from the environment. As explained in detail in other publications, this result is gratifyingly consistent with the second law of thermodynamics, and helps to invalidate the order-out-of-chaos concept for living systems." Reported by *John W. Haas, Jr.* (Gordon College)

A new Journal—*The Christian Scholar's Review*—will appear this fall under the sponsorship of some 15 Christian Colleges. The Review has as its primary objective the integration of faith and learning on both the intra and inter-disciplinary levels. *Journal* ASA readers interested in contributing articles should address their correspondence to the editor at Gordon College, Wenham, Massachusetts, 01984. Reported by *John W. Haas, Jr.* (Gordon College)

ASA Fellow Richard T. Wright has furnished a long overdue response to the charge that Christianity is to blame for the current ecological crisis. Writing in *BioScience* 20, 851 (1970) he provides a solid Biblical view of nature which effectively handles the charges of Lynn White, Jr., and Ian Mc Harg, and correctly pinpoints the basically sinful nature of man as being at the heart of the ecological problem. Wright suggests two strategies for corrective action: 1) an "ecological" strategy which would appeal to the self-interest of man and the need for a change in direction in order to survive; 2) a "theological" strategy which would emphasize "those areas of the Bible which support harmony between man and nature" and appeal to scriptural principles of stewardship and responsibility. This latter approach is seen as a supplementary means of reaching persons who can be influenced at this level. Reported by *John W. Haas, Jr.* (Gordon College)

Our Treatment of the Environment in Ideal and Actuality, by Yi-Fu Tuan. *American Scientist* 58, No. 3, 244-249, May-June 1970. The author is professor of geography at the University of Minnesota and his primary interest is in attitudes toward the environment. He points out that Christianity has come under recent criticism as fostering in its historical development an exploiting attitude toward the environment and in fostering "Western man's prideful faith in perpetual progress." On the other hand, primitive and pantheistic cultures are seen by many Westerners to have an attitude of respect for the sacredness of nature and this respect has resulted in much less environmental exploitation. Dr. Tuan refutes these assertions in some detail. The belief in perpetual progress (with the manipulation of nature as a means to that end) was present in both Greco-Roman antiquity and the Orient independent of and before Christian influences. Secondly, two key ideas have recently received greater recognition: (1) The balances of nature can be upset by people with the most primitive tools. (2) A wide gap may exist between a culture's ideals and their expression in the real world. Dr. Tuan provides solid historical evidence for the validity of these ideas. He sees that China and the pagan and Christian West have been equally guilty of environmental exploitation. Reported by *W. Jim Neidhardt* (Newark College of Engineering).

Patrick Romanell, **"Medicine and the Precariousness of Life,"** *The Philosophy Forum*, Vol. 8, No. 2, December 1969. A rather inconclusive but suggestive article on what we might learn about the human condition by reflecting upon disease and medical practice. It is particularly suggestive, I think, in discussing the way in which disease makes clear and insistent the possibility of failure in human life, and the way in which *tragedy*, a conflict between goods (rather than between good and evil), is often involved in medical practice. He does not, however, discuss the possibility that both disease and medical practice may be in one sense *unnatural*, at odds with the deepest reality of the world and of our own destiny, and that this may be a factor in the way in which we think of them. Reported by *George I. Mavrodes* (University of Michigan)

"Moral Theology and Genetics" by Charles E. Curran *Cross Currents* XX (1), 64 (1970) Catholic theologian Charles E. Curran considers the ethical problems related to man's emerging ability to modify his genetic make-up through the approaches of eugenics, genetic engineering and euphenics. The author suggests three emphases from his theological perspective: (1) an appreciation of history and a historical consciousness which sees development, is open to change yet "can avoid the extremes of an immobile classicism or the complete discontinuity of sheer existentialism", (2) an awareness of both the individual and society which avoids the dangers inherent in either having undue power over the other, and (3) a concern that man's increasing power does not cause him to ignore his limitations and sin. Curran rejects any "utopian view" of genetics, is suspicious of man's ability to make "right" decisions, warns of potential loss of human values for the sake of scientific advance and the dangers of success orientation vs. a Christian view "which does not see value primarily in terms of what one does or can do for himself or others but in terms of what God has done for him". Curran has made a significant addition to the continuing dialogue. Reported by *J. W. Haas, Jr.* (Gordon College)

Fitness of an Escherichia coli Mutator gene by Thomas C. Gibson, Mary L. Scheppe and Edward C. Cox. *Science* 169, 686-688, 14 August, 1970. The *E. coli* gene *mut T* is a general mutator increasing transversions at AT to CG. When raised in competition with a control strain without this gene, the *mut T* strain was fitter than the control, under some conditions greatly so. This is one of many studies indicating that although most individual mutations are harmful, mutations in general usually confer selective advantage. Reported by *Martin LaBar* (Central Wesleyan College)

Natural Selection and the Complexity of the Gene by Frank B. Salisbury, *Nature* 224, 342-343, October 25, 1969. Salisbury makes some admittedly wild assumptions, but seems to show clearly that either all specific individual genes cannot have arisen by mutation, or there is something we do not understand about the mutation process. Thus, if he is correct, most of the genes on which natural selection has worked cannot have arisen by mutation. The chance of a suitable DNA to code, say, active lactate dehydrogenase enzyme, arising by mutation on earth in four billion years of continuous DNA replication is about 10^{-500} according to Salisbury. Articles in *Nature*, May 23, 1970 (226, 754) and June 6, 1970 (226, 948) argue for and against Salisbury, but do change the fundamental argument, in my opinion. Reported by *Martin LaBar* (Central Wesleyan College)

A Physicist's Renewed Look at Biology: Twenty Years Later, by M. Delbruck. *Science* 168, No. 3937, 1312-1315, June, 1970. The author is professor of biology at the California Institute of Technology and this article is the lecture he delivered in Sweden upon joint receipt of the Nobel Prize, Dec. 10, 1969. Dr. Delbruck reviews the great progress that has been made in molecular genetics in reducing the break between the non-living and the living world. He points out that while neurobiology "has taught us the proper way to reconcile the characteristics of the living world, generation, development toward a goal, and decay with the contrasting incorruptibility and planlessness of the physical world, it has not resolved our uncertainty about the proper way to relate this language to the notions of 'consciousness,' 'mind,' . . ., 'truth'—all these notions, too, elements of our 'world.'" Toward these ends future research will be directed. Significantly, Dr. Delbruck has two major reservations concerning neurobiology. He first argues that we have seriously overestimated our understanding of cell biology and cell-cell interaction. Secondly, neurobiology should be properly limited by the a-priori aspect of the concept of truth. Dr. Delbruck points out that in analyzing language structure, the logicians have discovered there must be sentences that are true but not provable. "Thus the notion of truth, if it to be meaningful at all, must be distinct and prior to the system of provable sentences, and thus distinct from and prior to the computer which should be looked upon as the embodiment of the system of provable sentences. Thus, even if we learn to speak about consciousness as an emergent property of nerve nets, even if we learn to understand the processes that lead to abstraction, reasoning, and language, still any such development presupposes a notion of truth that is prior to all these efforts and cannot be conceived as an emergent property of it, an emergent property of biology evolution." Reported by *W. Jim Neidhardt* (Newark College of Engineering)

Reassembly of Living Cells from Dissociated Components by K. W. Jean, I. S. Lovsch and J. F. Danielli *Science* 167, 1626 (1970) Combining the techniques of nuclear transplantation and cytoplasmic transfer, dissociated amoeba nuclei, cytoplasm, and membranes were reassembled to form viable amoebae The techniques of cell reassembly appear to be sufficiently adequate so that any desired combination of cytoplasm, nucleus, and membrane can be assembled into living cells. Reported by *Owen Gingerich* (Smithsonian Institute)

The Summer issue, 1970, *Religion in Life* 39, No. 2, contains a solid series of Essays related to current ethical issues involving science. Paul Ramsey, p. 170 in **Felicido/Infanticide Upon Request** argues convincingly against current "liberalizing of abortion laws" and the 1969 Statement of the Methodist Board of Social Concerns that "the fetus is not a person, but rather tissue with the potentiality in most cases, for becoming a person. . . ." Kenneth Vaux, p. 187 in **Cyborg, R.U. Human?** considers ethical problems which arise when man seeks to rebuild himself, and H. L. Smith, p. 193 in **Religious and Moral Aspects of Population Control** looks at the population problem from a Protestant point of view and offers four proposals for control of conception and birth. This series contains some interesting new slants on these often discussed subjects. Reported by *John W. Haas, Jr.* (Gordon College)

Science, Birth Control and the Roman Catholic Church by J.J.W. Baker in *BioScience* 20 (3), 143-151, (1970) It is probably not surprising that as the world crisis deepens and the earth approaches its Doomsday (the Biblical end of the world with a 20th century twist), scientists and theologians will come into more frequent conflict than in the past. Theologians blame science and technology for our present state of affairs. They would like to go back (present company excepted) to the "blank mind" state that existed in earlier times. Scientists, on the other hand, have become tired of waiting for the theologians to thunder from their pulpits about the dangers of having large families. These are some personal thoughts of my own but I recommend the reading of the above article where Baker takes the Roman Catholic Church to task on a number of related points. Possibly a few gems from the article will whet your appetite. He quotes an anonymous scientist as saying that "People—are beginning to see the R.C. church for what it is—an institution concerned with the maintanence of its own authority in a world it does not comprehend—". Baker says mankind simply cannot afford to wait two centuries for Rome to admit its errors (about birth control). He quotes another scientist as saying that without drastic world-wide population control, there will be no church anyway. Lastly he quotes from an editorial in the *New Scientist* "—Pope Paul VI has now gently joined the company of tyrants, but the damage he has done may well outclass and outlast that of all earlier oppressors." I might add that it is appropriate now for all Protestant clergymen to talk about the causes for the certain end of the world in the near future with the same fearlessness that they talk about hell and damnation. Reported by *Irving W. Knobloch* (Michigan State University)

Skin-Pigment Regulation of Vitamin-D Biosynthesis in Man by W. Farnsworth Loomis in *Science*. 157, 401-506 (1967). Loomis is professor of biochemistry at Brandeis University. He sets forth a theory for the observed variations in skin color in humans based on the body's need for vitamin D. He admits that all anthropologists do not agree with him, but his thesis remains an interesting possibility. "Unlike the water-soluble vitamins, too much vitamin D causes disease just as too little does, for the calcification process must be regulated and con-

trolled much as metabolism is regulated by the thyroid hormone . . . Synthesis of too little vitamin D results in the bowlegs, knock-knees, and twisted spines (scoliosis) associated with rickets in infants whose bones are growing rapidly . . . Ingestion of vitamin D in amounts above about 100,000 I.U. (2.5 milligrams) per day produces the condition known as hypervitaminosis D . . . Ultimate death usually follows renal disease secondary to the appearance of kidney stones. . . It is the thesis of this article that the rate of vitamin-D synthesis in the stratum granulosum of the skin is regulated by the twin processes of pigmentation and keratinization of the overlying stratum corneum, which allow only regulated amounts of solar ultraviolet radiation to penetrate the outer layer of skin and reach the region where vitamin D is synthesized." Loomis makes a strong case correlating skin color with latitude and proposes the evolutionary development of white skin in the North and black skin in the equatorial regions as a mechanism for regulation of vitamin D in the body with subsequent survival. He proposes that hair was lost from the body of light colored people to permit more ultraviolet light, but does not face the problem of lack of hair on black people. Loomis assumes long periods of time were necessary for the development of skin color although he points out that an American Indian who arrived in this continent ten to twenty thousand years ago shows definite skin darkening as the Equator is approached. He did not consider the Caucasian migration into Southern India about three thousand years ago which has resulted in a very dark skinned race in Southern India. An interesting subject and one which ASA members may well consider as we strive to eliminate prejudice on the basis of such a superficial thing as skin color. Reported by *Thomas D. Parks* (New Jersey)

Why Is Space Three-Dimensional? Based on W. Buchel: "Warum hat der Raum drei Dimensionen? . . . translated and adapted by Ira M. Freeman. *American Journal of Physics*, 37, No. 12, December 1969. Without exception, the laws of physics are such that they can be generalized to spaces of any number (N) of dimensions. Yet our senses lead us to believe that physical space is three-dimensional, neither less or greater. The article summarizes a wide variety of arguments that further confirm this belief that physical space is restricted to N=3. Stable systems in both the macrocosm and microcosm are shown to be impossible for N>3. The propagation of signals by waves (both sound and electromagnetic) free of distortion and reverberation is possible only in one or three dimensions. One can further argue that the development of higher forms of life is impossible in spaces where N is less than three as the network of nerve connections between cells must be such that nerve impulses do not mutually interfere in crossing one another. Topological arguments indicate that mutual interference would occur for one or two dimensions. Thus both physical laws and the tridimensional nature of physical space are required to yield a satisfactory knowledge of physical reality as we know it. Reported by *W. Jim Neidhardt* (Newark College of Engineering)

Supporting Evidence for the Theory of the Steady State, by Dietrick E. Thomsen. *Science News* 97, No. 19, 464-65, May 9, 1970. **Galaxies and Quasars: Puzzling Observations and Bizarre Theories,** by Robert W. Holcomb. *Science* 167, 1601-1603, 20 March 1970. Both of these articles discuss the work of Frank Low as reported in the March issue of the *Astrophysical Journal Letters.* Dr. Low is convinced that strong sources of broad-band infrared, which he calls irtrons, are characteristic of the centers of all galaxies, though not always at the same power level. He suggests that the irtrons are the seats of continuous creation of matter in the universe. Because the continuous creation of matter was originally proposed in connection with the steady-state cosmology, both articles propose that as a result of Low's speculations the battle over rival cosmologies is wide open once again. The *Science* article goes on to mention briefly recent work of Fred Hoyle on the steady-state cosmology. The *Science News* article goes on to mention recent infrared observations made by an MIT group that appears to contradict the currently widely accepted ideas of a 3-degree blackbody background radiation. The author does not indicate the great amount of skepticism with which this observation has been received by most knowledgeable astronomers. Reported by *Owen Gingerich* (Smithsonian Institute).

ASA Member David Foyt examines the use of the Second Law of Thermodynamics in cosmological questions in the *Restoration Quarterly* 12, 181 (1969) and 13, 17 (1970). In **Creation and the Second Law of Thermodynamics** he indicates some of the inadequacies of the traditional claims of Christian apologists and concludes that "while the second law may provide a useful *argumentum ad hominem* regarding the mutability of the cosmos, it should not be employed to establish a temporal beginning (or to predict its final heat death) without admitting that other interpretations of the law are possible as well." The second article **The Second Law of Thermodynamics in Cosmic Perspective** extends the discussion to include a variety of other "world views" and suggests an approach for the Christian where there is apparent conflict between his beliefs and scientific laws. Reported by *John W. Haas, Jr.* (Gordon College)

Michael Novak, Kingman Brewster, and Sidney Hook, **Universities in Crisis,** Current, No. 117, April 1970. These three essays are excerpted from separate articles or books by these three authors. They discuss student rights, consultation vs. decision making power, making university education more of a voluntary matter, and, to a small degree, the purpose of a university. They do not discuss the extent to which the decay of the university may be related to changes in the basic intellectual climate, the way in which we think about men and their place in the universe. Nevertheless, essays such as these provide some input for Christians who are thinking about what they can expect from universities in the near future and what contributions to them they might try to make. Reported by *George I. Mavrodes* (University of Michigan)

There is no way to peace along the way of safety. For peace must be dared. It is the great venture. It can never be made safe. Peace is the opposite of security. To demand guarantees is to distrust, and this distrust in turn brings further war. To look for guarantees is to want to protect oneself. Peace means to give oneself altogether to the law of God, wanting no security, but in faith and obedience laying the destiny of the nations in the hand of Almighty God, not trying to direct it for selfish purposes. Battles are won not with weapons, but with God. They are won where the way leads to the cross. Which of us can claim to know what it might not mean for the world if one nation should meet the aggressor, not with weapons in hand, but praying, defenseless, and for that very reason protected by a "bulwark never failing"?

Dietrich Bonhoeffer, 1934

From an informal talk at a daily gathering for prayer at the Universal Christian Council for Life and Work, Fanø. Gesammelte Schriften, *herausbegeben von Eberhard Bethge, Vol.* 1, *p.* 448

BOOK REVIEWS

GOD & GOLEM, INC. *Comment on Certain Points where Cybernetics Impinges on Religion* by N. Wiener, MIT Press, Cambridge, 1969. Paperback. $1.95.

The author makes a point of the fact that we must face up to some startling realities. Accepting religion as defined broadly by our contemporary secular world, it is true that recent developments in computer science do encroach on some areas of religion. However, the topics discussed in this note have no effect on a true Christian perspective.

The discussion begins with a plea to the reader to divest himself of all emotional religious overtones and face facts. He indicates that his revelations might be tantamount to support of witchcraft in the dark ages or acceptance of Darwinism in the last century. I suspect his claims were well founded in 1963, but in this present day of rapid change we are becoming accustomed to many so-called radical new concepts without getting particularly upset.

The author is also possibly correct in suspecting that many church-oriented people are too emotional about some sacred "absolute" qualities. For instance, the word omnipotence is probably wrought with over-emotion and is actually meaningless. "Can God make a stone so heavy that He cannot lift it?" What one really means is that God's attributes far exceed one's wildest imaginations.

Professor Wiener's note deals with three items of supposedly religious significance.

1) Machines can learn.
2) Machines can reproduce themselves.
3) Machines and man can work together.

Of these three topics, the third is most relevant to today's world. In fact, the third item would be particularly disturbing to anyone who is not aware that God really does have a plan for this present world and that our God is a personal God who cares for each of us who have accepted Christ as our personal Saviour.

Machines can learn. His example is the checker-playing computer that is capable of improving its ability. In fact, it learns from experience just as humans do. He feels this is upsetting to people who claim God has created them uniquely as thinking people "in his image". Possibly such a response would be prevalent in his generation. I, myself, found nothing disturbing to my Christian experience.

At this point, he also includes some theory of games which he likens to religious expression. By playing a game, we discover certain moves that enhance our chances of winning. He suggests that religious action such as prayer is playing a game with God in order to better our lot in life.

The author concludes by combining the thoughts that religion is like a game, and machines can learn to play games better than their human designers. This juxtaposition of ideas is certainly thought provoking to a religion based on works, but the idea that we react in a religious fashion for personal gain is definitely not a New Testament concept. Thus, these notions have no pertinent effect on Christianity.

Machines can reproduce themselves. Computers have been employed to reproduce more sophisticated computers. This supposedly again impinges on God creating us in "his own image". I see no difficulty unless one reads into this some sort of uniqueness criterion.

Machines and man can work together. This is a real threat in today's world. In 1963 this was prophecy. It is now accepted fact. A machine can make decisions for us with great speed *but* it ignores the consequences! A machine can be programmed to make a decision based on certain values. Our present dilemma is that no one knows what values are morally "right". A machine is valuable in a world of absolutes, but it can be very dangerous in a world of "relative" values. The present decade is one of turmoil with respect to moral values and the great issues: the bomb, over population, starvation, progress and pollution, social reform. The moral overtones are not fixed. Hopefully, world leaders will use "pushbutton answers" with caution. Actually when you realize the traumatic decisions facing a disbelieving world, it is a true comfort to realize the Holy Spirit is willing and pleased to guide each of our lives. Thus, once again, he speaks to secular religion but completely misses our Christian experience.

Reviewed by Richard Jacobson, Department of Mathematics, Houghton College, Houghton, N.Y.

EXPERIENCE AND GOD by John E. Smith. New York: Oxford University Press, 1968. 209 pp. Index.

The author is concerned about the fideistic elements in contemporary theological thought and philosophy of religion. He sees fideism as an attempt to save religious faith from the attacks of modern empirical science which cannot find God through observation of empirical reality. Empirical science is viewed as a necessary and positive element in the apprehension of truth, but is gently rebuked when it becomes a scientism with its own presuppositions about (and often against) the possibility of religious faith. Science is simply one way of viewing reality; it is a dimension of the environment of men. The concept of dimension is important in order to understand Smith. It is not that science may investigate reality, reach its conclusions, and then leave the mysterious open for a religious interpretation. It is rather that the scientific dimension is one avenue to and aspect of reality; the religious dimension is another way and the all-embracing way to approach, apprehend, and understand reality. Science deals with the empirical aspect of reality, but human experience is greater than empiricism. Men must enlarge their concept of experience if they are

to understand the full dimensions of reality. This enlargement is the religious dimension. All men begin with a given, a pattern of facts, experience, and interpretation. To limit truth to one approach (science) is to do despite to the full-orbed personality—God. A proper approach is one which combines empirical observation and interpretation. The self-reflecting personality with its ontologically-given sense of God as ultimate reality will not exclude the transcendance of the experienced religious dimension of reality. This is not fideism, for it includes all observable, experienced aspects of existence. For Smith, an enlarged understanding of experience permits one to argue for the religious dimension given to reality by the transcendent, revealing God.

Has Smith succeeded in his task? Certainly he points out the weakness involved in using scientific method as a scientism, open only to the empirical. Certainly in form and intent he safeguards the objectivity and transcendence of God in His Self-revelation. Surely he is no fideist; he stands squarely within the empirical tradition and exhorts his co-laborers to broaden their perspective. Yet, for all this, Smith has failed to recognize the finitude, weakness and brokenness of reason as it, in formal function, apprehends reality and, in interpretive essence, invests reality with meaning. Can an enlarged concept of experience bring us to God? It is one thing to emphasize God's transcendence and revelation along with a religious dimension of life. It is another task to show the cohesive and coherent relation between the two. Is not a *new* experience, a *miraculous* experience, in which God directly enters into relations with the human personality needed? Must man, can man broaden his horizons, enlarge his appreciation, climb his own ladder and then put up another extension in order to find God? Holy Scripture, church confession, and personal testimony teach that it is not enlarged experience and chastened empiricism that brings man to God, but rather transformed experience in terms of new relationship and invaded empirical reality (The Word was made flesh) that enables one to see Him who is full of grace and truth.

Reviewed by Irwin Reist, Associate Professor of Bible, Houghton College, Houghton, N.Y.

IN GOD'S IMAGE by Jacob Rosin, New York: The Philosophical Library, 1969, 81 pp. $4.00.

The author, a research chemist, calls for the establishment of "the Science of Prophecy" which he predicts will, when circumscribed by certain rules, be more exact in fact and interpretation than is the present study of history. "Basic Laws" proposed for governing this science include among others: "anything which is theoretically possible will be achieved;" "all predictions should be limited to positive statements of future achievements and should not contain negative predictions;" and "predictions should be limited to inevitable events and should include nothing which is merely probable."

The first prediction the author ventures is that "progress in research into the chemistry of proteins and nucleic acids will continue" and will ultimately lead to a higher form of manlike animal, *homo sempervirens*, who will be sexless, omnipotent, omniscient, morally perfect, immortal—"indeed, the very image of God . . . living in a world of abundance like Paradise before the Fall or Heaven after the Final Judgment." Genetic engineering is inevitable and the result can only be Utopia.

Possibly the greatest contribution this book can make is its stimulation of a reader to write another presenting Christian alternatives.

Reviewed by Stephen W. Calhoon, Jr., Department of Chemistry, Houghton College, Houghton, New York

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HOW THE WORLD BEGAN: *Man in the First Chapters of the Bible* by Helmut Thielicke, Fortress Press, Philadelphia, Pa., translated with an introduction by John W. Doberstein, 1961. 308 pp. Paperback. $2.50.

Sermons delivered over a two-year period by the well-known German theologian explore the content of the first eleven chapters of the Bible. Under the general headings of the Beginning, the Creation of Man, the Story of the Fall, the Story of Cain and Abel, the Story of the Flood, and the Building of the Tower of Babel, Thielicke traces all the great themes of Christian doctrine implicit in these opening chapters of the Bible and drives home their timeless application and their ultimate significance for man and his world. It is a tribute to his mastery of the subject that these chapters derived from sermons are able to speak to a quite general audience with profound meaning. Significantly he writes in an introductory chapter,

> Among the many things that distort our view of God and 'against' which we must therefore believe, are our misunderstandings. Often misunderstandings are based upon the fact that we confuse the figurative, mythical, ancient-cosmological forms of expression in these texts of the first chapters of Genesis with the thing itself, instead of seeing in them the code language of a time long past which we must translate into the clear words of our own language. . . . I am not concerned with cheap apologetics when I seek to remove misunderstandings. For I have no desire to tone down these texts and prepare them appetizingly so that respectable citizens of the twentieth century can swallow them with pleasure and digest them without getting a stomachache.

He returns to this same theme in a Postscript, as he points out his belief that when these messages are spoken to one in his own language, they strike home, even with hostile and menacing import to shake his life. All too often the familiar and traditional ecclesiastical phraseology leaves him untouched and deprives him of the real message of the Word.

It is an impoverished reader indeed who comes away from these early chapters of the Bible with only some theories of cosmology and historical origins.

Reviewed by Richard H. Bube, Department of Materials Science, Stanford University, Stanford, California.

Making Our Poison Our Medicine

Let us delight that our Biblical Faith no longer has a scientific-historical foundation. Professor van de Fliert (*Journal ASA* 21, 69 (1969)) has done a masterly job of showing that Biblical Christianity cannot be reconciled with contemporary geological truth. Thanks for constructing a sandstone foundation where Professors Morris and Whitcomb were able only to construct a "loose sand" foundation..

The evangelical may apologize now more heartily in the intellectual community as he seeks to wield the "dull" sword of the Spirit rather than the full blade of Biblical Truth.

Of course it should be obvious to all evangelicals, as Professor van de Fliert has so ably demonstrated, that belief in inerrancy in scientific-historical matters has done more to undermine a Biblical Faith than belief in a mere amalgam of evolutionary and Biblical thought. Thanks again to Professor van de Fliert for making our poison our medicine.

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Appreciation

The June issue (*Journal ASA* 22, No. 2 (1970)) was truly excellent. I especially appreciated the emphasis on medical ethics—birth control, abortion, etc. I think the statements of the Christian Medical Society were Biblical, sound and reasonable.

I appreciated very much your critical review of Bolton Davidheiser in the March issue (*Journal ASA* 22, 28 (1970)) I heard him speak to a local fundamentalist church group on the contradictions, weaknesses, etc. in biological evolutionary theory. Most of his arguments were full of non-sequiturs, circular reasoning, outdated science, faulty Biblical exegesis and hermeneutics. The task of the ASA is made more difficult, I think, because scientists who are non-Christians get the impression that Christians are divided over the relationship between science and religion.

Jerry D. Albert
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A Very Naive Approach

After being connected with A.S.A. for a number of years I find it necessary to bring the association between us to a close. I find in your *Journal* just that confusion of thought and logic which characterizes the attitude of the entire scientific community towards the Hebrew and Greek scriptures (that most people who call themselves Christians know as the Holy Bible.)

I find in the pages of the *Journal* a very naive approach to science and the scriptures. It seems from these pages that everything presented by scientists as the truth must be true, without a second examination for actual proof. On the other hand, scripture is interpreted (or twisted) to say anything else but that which it really says. Anyone who takes certain scriptures at face value faces castigation in your pages. (See *Journal ASA* 22, 28 (1970) for one good example.)

I would appreciate very much the removal of my name from your mailing and membership lists.

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Transitional Fossils Well Known

In my opinion, John N. Moore's article (*Journal ASA* 22, 82 (1970)) is based upon a number of errors, chief of which is his assertion (p. 84) that transitional fossils do not exist and that therefore scientific opposition to organic evolution is reasonable and justifiable. Unfortunately for his (and many similar evangelicals') arguments, many transitional fossils do exist and are well-known to paleontologists. For example, on high taxonomic levels, numerous forms exist which collectively bridge completely the present-day gaps between amphibians and reptiles, and between reptiles and mammals. Similarly, on low taxonomic levels, many series are known in which morphologically transitional fossils are found as chronological intermediates between earlier primitive species and later advanced species. Such series are known (and published in the paleontologic literature) among late Paleozoic bryozoans from the U.S., mid-Paleozoic brachiopods from the U.S. and Europe, Cenozoic mollusks from the U.S. Gulf Coast, and Cenozoic foraminiferans from the southwest Pacific, to cite only a few.

It is time for evangelical scientists to stop wasting time fooling themselves that evolution did not happen. We should be dealing instead with determining the implications for our outlook posed by the apparent use of evolution as God's means of creation, and with repairing the damage done to evangelical non-scientists' outlook by our collective refusal to take seriously the well-founded contributions of paleontology, geology, and biology.

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What Do You Think of THAT?!

Contributions to Medicine from Engineering
A fascinating list of contributions from engineering to medicine can be drawn up as these two disciplines cooperate with one another in service to man. As examples of such contributions a recent publication shows a disposable-membrane artificial lung, an artificial heart designed for total replacement of the natural organ, a disc-valve heart chamber, a catheter-tip electromagnetic blood velocity probe, an isotope-powered pacemaker, and prosthetic devices for amputees. (*Engineer.* January-February 1970, p. 13)

"Boob Tube" or Instrument of Salvation?
The Child Evangelism Fellowship of P.O. Box 1156, Grand Rapids, Michigan 49501 has moved to give children TV-watchers something on the Saturday morning cartoon parade besides violence, sex and crime. In October 1970 a TV program, "The Treetop Club," was released for 15 select trial stations. The half-hour, full color, action-packed program attempts to proclaim the Gospel in a manner appropriate for its audience. The average cost is in excess of $500 per week on most stations, but each station reaches potentially 400,000 children.

Necessity of Prior Truth
In his Nobel Laureate Address in December 1969, M. Delbruck argues that "even if we learn to speak about consciousness as an emergent property of nerve nets, even if we learn to understand the processes that lead to abstraction, reasoning, and language, still any such development presupposes a notion of truth that is prior to all these efforts and that cannot be conceived as an emergent property of a biological evolution." (*Reported in Science* 168, 1313 (1970); *copyright by the Nobel Foundation* 1970; *called to our attention by David Saunders of Baltimore, Maryland*)

Anti-Semitism at Oberammergau?
The American Jewish Committee has published a 24 page booklet to prove that the famous Oberammergau Passion Play still presents a case of religious anti-Semitism. It argues from a line-by-line analysis of the text that revisions made after the 1960 version are inadequate. Misrepresentations to be avoided in such plays are (1) concealing the Jewishness of Jesus and His friends, as well as his enemies; (2) conveying the impression that all Jews of Jesus' day willed His death; (3) changing the "crowd" before Pilate into a screaming "mob" representing all Jews; (4) depicting Pilate as an innocent and kindly bystander; and (5) highlighting such Gospel statements likely to be misunderstood by uninformed audiences, e.g., Matthew 27:25.

What Do You Think of THAT?!

Christians For Peace

A new peace movement has appeared on the scene, claiming to combine Christianity, peace and patriotism. Its attempt is to show that peace is a life style and more than a tool to use when war threatens. The organization has produced a poster declaring, "Peace is Patriotic." (*Christians for Peace, Box 206, Harrisonburg, Va. 22801*)

Right Face! Creationism and Americanism

A new educational enterprise called Christian Heritage College has been founded in San Diego, California. Faculty sign a "very fundamental Statement of Faith." The three distinctives of the new college are claimed to be (1) "Practical Christianity, based without apology on the Word of God with special emphasis on the Spirit filled life and witnessing;" (2) "Academic Excellence, assured by Henry M. Morris as Vice President of Academic Affairs;" and (3) "Americanism, Patriotism and Emphasis on our Christian Heritage . . . . in sharp contrast to the liberal one-world philosophy taught in secular colleges and in some Christian colleges." Associated with the College is the Creation Science Research Center intended to help "promulgate and credential the concepts of Creationism," with Dr. Morris, "probably the best known scientist among Christians today," as Director.

Parenthood: Right or Privilege?

This is the title of an editorial by Garrett Hardin in which he argues that "if parenthood is a right, population control is impossible. If parenthood is only a privilege, and if parents see themselves as trustees of the germ plasm and guardians of the rights of future generations, then there is hope for mankind." From a strictly Christian and Biblical perspective, is parenthood a right or a privilege? (*Science* 168, 427 (1970))

The Most Expensive Abortion

Donald P. de Sylva of the School of Marine and Atmospheric Sciences of the University of Miami, Florida, points out that the cost of the unsuccessful Apollo 13 moon shot was about $380 million, which compares with the total annual appropriation of $400 million to the National Science Foundation in 1969. He suggests that this makes the unfortunate moon shot the most expensive legal abortion in history. (*Science* 168, 1287 (1970))

In September, 1941, five scientists of deep Christian conviction met together in Chicago. They found that they shared mutual concerns in the relationship of science and Christian faith. The **American Scientific Affiliation** is an outgrowth of that meeting.

ASSOCIATE MEMBERSHIP is open to anyone with an active interest in the purposes of the Affiliation.

MEMBERS hold a degree from a university or college in one of the natural or social sciences, and are currently engaged in scientific work.

FELLOWS have a doctoral degree in one of the natural or social sciences, are currently engaged in scientific work, and are elected by the membership.

Members of the Affiliation endorse the following statement of faith: The Holy Scriptures are the inspired Word of God, the only unerring guide of faith and conduct. Jesus Christ is the Son of God and through His Atonement is the one and only Mediator between God and man.

DUES for these three types of membership are: Associciate $8.00, Member $12.00, and Fellow $15.00, per year. A member in any of these three categories can take the *special student rate* of $3.00 per year as long as he is a full time Student.

PUBLICATIONS include the ASA News (sent to all members four to six times each year); two symposia: *Modern Science and Christian Faith,* F. Alton Everest, Editor, Van Kampen, Wheaton, Illinois (1950) (out of print), and *Evolution and Christian Thought Today,* Russell L. Mixter, Editor, Eerdmans, Grand Rapids, Michigan (1960). Individual authors are also encouraged to publish independently when this seems desirable.

LOCAL SECTIONS of the American Scientific Affiliation have been organized to hold meetings and provide an interchange of ideas at the regional level. Information may be obtained from the persons listed below or from the national office.

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